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FOREIGN BODIES AND THE USE OF X-RAY EXAMINATION IN THEIR LOCALIZATION AND REMOVAL*

WILLIS F. MANGES, M.D., Sc.D.

Philadelphia

IT IS an honor of the first order, and a privilege that is very highly appreciated, to be permitted to give this, the third Russell D. Carman Memorial Lecture, sponsored by the Minnesota Radiological Society and adopted by the Minnesota State Medical Association as part of the program of their annual meeting.

Doctor Carman was my contemporary and my friend. I was first attracted to him by his remarkable resemblance to a man who, more than any other, afforded me the opportunity to study medicine on my own resources. At the end of my internship, in June of 1904, this same man, Doctor Joseph Neff, the Medical Director, appointed me roentgenologist to the Jefferson Hospital to succeed Doctor Metheny, who wanted to discontinue the work.

It is small wonder then that the likeness in appearance of these two men should have drawn me to Doctor Carman. I received much from both of them—from Doctor Neff, opportunity and friendship; from Doctor Carman, friendship and inspiration.

Carman's most striking characteristic to me was his charming personality. He was strong mentally and physically, and at the same time more than ordinarily gentle. He accomplished a prodigious amount of work but never seemed to be in a hurry. He played less than most men, but was a delightful companion in moments of relaxation. He had a fine sense of humor, which was evident even when he seemed most serious. He was keen, unfaltering, and accurate. He had the courage to record his conclusions regardless as to whether or not succeeding events would substantiate his findings. He was not boastful of his successes, but I dare say the surgeon had to be most thorough and exact in his operative work before venturing to say that Carman was wrong. His enthusiasm and interest in his work, as well as accomplishments, fitted him well for the enviable position he held in that great institution, the Mayo Clinic. He required large opportunity, and he had it there.

His contributions to the literature were of that clear, practical, and authoritative variety that has an enduring influence on the advancement of medicine. He accorded others generous credit, and throughout his writings—always in a modest way—he added much that was original and valuable.

Certainly, Carman has done more than any other American to bring fluoroscopy to the high plane of usefulness it occupies today. He accomplished this partly because he was more able than most men to handle the apparatus then available. He had an early and keen appreciation of the possible danger to himself, but was confident of his means of avoiding it. It is worthy of note that those who have followed in Carman's footsteps at the Mayo Clinic have recently shown in a truly scientific way that fluoroscopy as he practiced it is a safe procedure.

Probably the real explanation of Carman's success lies in the facts that he excelled as a roentgenologist, was an able clinician, a real student of medicine, and that he developed early an appreciation of the value of coöperation with those who practiced other parts of medicine and surgery.

*The Russell D. Carman Memorial Lecture for 1936, presented before the annual meeting of the Minnesota State Medical Association, Rochester, Minnesota, May 4, 1936.

I would say of him as DaCosta said of Samuel D. Gross: "He was a loss to humanity. He died too soon, for he was in the full possession of his splendid powers, and was doing his best work."

As I said before, I received from Carman friendship and inspiration. I saw him doing fluoroscopic work and was greatly impressed not only with his skill, but also with the amount of diagnostic information he obtained. From that time to this I have profited by the inspiring effect of that first visit. I am sure that much of what I have accomplished has come through his influence.

If the roentgenological phase of this lecture has any merit, it is due largely to the information derived by means of the fluoroscope. I would like, if there were time, to recite to you in detail the many difficult problems in removal of opague foreign bodies that have been successfully solved with the aid of the two-plane fluoroscope. The number of foreign bodies I have helped to remove in this way from the air and food passages runs high into the hundreds; a few have been taken from the brain; numerous others from various parts of the body; and in twenty instances I have successfully guided the forceps of Doctor Cross to nonmagnetic metallic foreign bodies in the eyeball, so that they were removed without loss of the eyeball except in one case when there was infection before the operation. In one case the foreign body was a shot no larger than a mustard seed. In another two pieces of brass were removed from the same eye.

I come now to speak of foreign bodies in the air passages.

Foreign Bodies in the Air Passages

This is a subject of universal importance because the human mouth is used as a receptacle for all sorts of things, not only food and liquids, but also an endless variety of articles that are neither food nor drink. The anatomy and physiology of the structures involved are alike in all human beings. I believe it is safe to say that during the first few years of life at least the inclination to put into the mouth anything that can be carried to it in the hand is a natural habit. The large majority of these accidents occur in young children.

When an object gets into the mouth, it will do one of four things. It will be ejected, it will go down the esophagus, it will go into the lower air passages, or, occasionally, it will go upward into the upper air passages by way of the nasopharynx. Fortunately, most things go into the esophagus, and when they are proper things in proper amounts they go on into the stomach, providing that the esophagus is normal. We are concerned here with the objects that go into the lower air passages.

Most people have had the experience of having some small article of food or few drops of liquid go down the "wrong way," so that probably most of you realize how easy it is for such an accident to occur, and can also appreciate how prompt the structures in the air passages, especially those of the larynx, usually are to resent this abnormal invasion. I need only to assure you, then, that larger objects frequently take the same route, and may cause no more immediate result than the few drops of water or the very small particle of food, to make you realize the possibilities and the widespread opportunities for accidents of this sort that eventuate in the condition spoken of here as foreign bodies in the air passages.

What happens later depends upon the nature of the foreign body, its size, shape, and location. A definite, though very small, percentage are expelled during a coughing paroxysm; more rarely they escape during the relaxation of sleep; and also rarely, they may disintegrate and come away with secretions. Not infrequently they cause sudden death. In a very large percentage of instances the foreign body stays in the larynx, trachea, or bronchi until removed. If not removed the patient becomes an invalid sooner or later with the utmost certainty, and frequently has a very much shortened span of life.

One of the most thorough and interesting articles on this subject, from the clinical and surgical points of view, that I have been able to find is a monograph written by Samuel D. Gross, in 1854. He made a very thorough study of the medical literature of all countries and in all found record of only 200 cases. To these he added 50, most of which had come under his personal observation or treatment. His description of the usual history of onset, the symptoms, physical signs, and the resultant pathology, is not excelled by anyone in modern literature. Many

of the more recently discovered signs and symptoms are clearly stated in his writings. For instance, McCrae in his Lumlian lectures stated that the only physical sign common to all cases was limited expansion on the side of the foreign body. Gross speaks of the "Diminution if not entire absence of motion in the ribs." Jackson has emphasized the "period of calm" that frequently follows after the initial paroxysm of cough. Gross says, "The period of calm which ensues after the first paroxysms have passed away varies very much in its duration." He refers to the occasional asthmatic type of symptoms, and Jackson has emphasized the asthmatoid wheeze. I thought at one time that I had discovered roentgenologically the state of obstructive emphysema that occurs so constantly in certain types of foreign bodies, but I soon learned that Dr. Iglauer had made the same discovery some years before, and I found still later that Gross had given a beautiful description of the same thing from physical signs and post-mortem findings in 1854. There is practically nothing new since the days of Gross except the use of the roentgen rays and the instruments of the bronchoscopist. The diagnosis has become a certainty, if the patient is given adequate study, and the high mortality of the older surgical methods has been completely eclipsed by the almost negligible mortality of the well-trained bronchoscopist and roentgenologist. The number of cases recorded by the bronchoscopists runs well up into the thousands. Their accomplishments constitute one of the most useful and interesting chapters of modern medicine.

It is my particular function to tell you of the part the roentgenologist plays, but it will probably not be inappropriate for me to dwell briefly before this audience on the clinical picture as I have learned it from the literature and considerable observation, because after all the family physician is the one who first sees the patient and has the initial responsibility.

History.—The adult and the child old enough to realize and describe the foreign body aspiration accident almost invariably give such a clear history that it is sheer neglect on the part of the physician who gets that first news and does not promptly have a roentgen ray examination to confirm the diagnosis and localize the foreign body.

The problem is more difficult where infants and young children are concerned, except when the accident is observed by an older person, and then again it is clearly the duty of the physician first in attendance to have a careful and thorough roentgen ray examination. At times the parents are at fault for not consulting a physician.

Regardless of age, the accident is usually immediately associated with a severe coughing or strangling attack, which may be brief or long. If the foreign body is not expelled, the coughing paroxysms will recur sooner or later, but that "period of calm" is at times of such length that the history of the primary attack is overlooked by the doctor, as well as the parents, and the diagnosis of bronchitis, asthma, pneumonia, or tuberculosis is made. In one instance, a young child had repeated severe coughing attacks after his brother gave him a bite of apple. The doctor said: "If he did get a piece down his windpipe, it will dissolve." After the child had been treated for pneumonia for several weeks, he was sent to the Jefferson Hospital, where roentgen ray examination showed there were positive signs of foreign body, but no evidence of pneumonia. A piece of apple stem was removed bronchoscopically. That first severe coughing attack is then a most important event. When it is repeated at intervals, the diagnosis is almost positive on the history alone.

Symptoms.—The important symptoms are cough—recurrent and paroxysmal in character—restlessness, dyspnea, anxious expression, exhaustion. Fever is common and also varies in degree, as well as duration, abates and recurs, and when infection complicates, the variations often reach the extremes. McCrae says that slight continued or irregular fever is common. All of these vary in frequency and intensity in different patients and frequently in the same patient.

Physical Signs.—The important physical signs are rapid and often jerky respiration, limited expansion on the affected side of the chest, variation in the percussion note, abnormal breath sounds with every conceivable type of râles, often more noticeable on the unaffected side, and more than occasionally there is a wheeze somewhat like that heard in asthma. Change in the voice is apt to occur when the foreign body is in the larynx. Gross cites a case reported by

Burow, German surgeon, in which a boy twelve years of age aspirated into his larynx the larynx of a goose, after which the sounds made by the boy at expiration were not unlike the voice of the goose. Aphonia or various degrees of hoarseness are frequent. Displacement of the heart is frequently present, and is apt to shift from side to side with inspiration and expiration. If the foreign body is free to move in the trachea a flapping sort of sound may be heard. All of these signs vary in different cases, and, I would like to say with real emphasis, they vary so frequently in the individual patient that the change in the physical signs from day to day or hour to hour comes to be of real diagnostic importance. The variations are due to change in location of the foreign body, inflammation of the trachea and bronchi, the accumulation and expulsion of exudate, and variation in the degree of obstruction produced by the foreign body and the swelling of the lining membrane. I have on many occasions seen foreign bodies move from one location to another, or have seen the indirect roentgen ray signs vary in degree or location under fluoroscopic observation.

I may say without fear of contradiction that, in the early stages, a *negative* diagnosis of foreign body in the air passages cannot be made by means of the history, symptoms, and physical signs. Also, it is only fair to say that, unless the roentgenologist is thoroughly familiar with all of the obtainable roentgen ray signs, and the means of eliciting them, his percentage of failure in diagnosis will be relatively high, especially in the nonopaque type.

Pathology.—The changes that take place in the lung distal to the foreign body depend, as above stated, on the nature, size, shape, and location of the foreign body. Inflammation is always present and may involve the bronchi of the opposite lung, either by extension or shifting of the foreign body. It is always of general distribution when the intruder is in the trachea. Exudate may collect distal to the foreign body and have difficulty in getting out. This condition was called "drowned lung" by George Johnston. Interference with drainage invites infection and bronchial stricture, which inevitably progress until the obstruction to drainage is removed. The infectious process may be prompt in developing, very active, and give all the clinical signs and symptoms of pneumonia or lung abscess. This is the usual happening with teeth, pieces of tonsil tissue, infected blood clots, etc. When drainage is established in one way or another, the patient is temporarily relieved, but if the foreign body remains, the infection is certain to recur. True lung abscess may ensue or the process will eventually develop into bronchiectasis.

Foreign bodies of long sojourn are worthy of special consideration. In the vast majority of instances, the pathological changes are on one side only, and distal to some definite point in the bronchial distribution, which represents either the location of the foreign body or the point at which it lodged to start the process. The foreign body may later go to a lower level when tissues are destroyed. Occasionally the entire lung of one side is involved, but mostly only the lower lobe. I have come to look upon a one-sided lower lobe chronic infection as of foreign body origin until proven to be of other source. An example of this kind was in the case of a young girl, without history of foreign body aspiration, who came to the Bronchoscopic Clinic because of a diagnosis of a chronic lower lobe infection. The roentgen ray examination revealed no foreign body shadow, but showed the sort of lesion so frequently seen in proven cases of foreign body that I ventured the opinion that there was a nonopaque foreign body present. The child improved under bronchoscopic drainage. On the eighth weekly treatment Doctor Clerf saw a little black speck through the bronchoscope and thereupon removed a tuft of grass in an excellent state of preservation.

In the early stages other changes may occur that depend upon the degree of obstruction produced by the foreign body and the physiologic expansion and contraction of the trachea and bronchi during inspiration and expiration respectively. When the foreign body lodges in a bronchus and causes a degree of obstruction that will not completely prevent air from entering the lung during inspiration—while the bronchus is expanded—but will interfere with equal escape of the air during expiration—when the bronchus is contracted—the lung distal to the foreign body remains more or less distended with air throughout the respiratory cycle. In short, a state of obstructive emphysema exists. Under

such conditions, a foreign body in the trachea will produce obstructive emphysema of both lungs.

Now, if the foreign body fits in a bronchus just a little bit more tightly and prevents air going in at inspiration, lung collapse follows, because the air distal to the obstruction is absorbed by the blood stream. Atelectasis will occur when the foreign body because of its size, shape and weight becomes tightly impacted in the bronchus; it will follow when bronchial membrane swelling around the foreign body is completely obstructive; or it will follow when the foreign body is capable of absorbing moisture, thereby increasing its size beyond the physiologic expansibility of the bronchus. The bean, as a foreign body, almost always does just this. Foreign body atelectasis is a very serious situation for the patient because with the pressure of the collapsed lung distal to it, and the pull effect of the other lung, the foreign body may suddenly be forced out of its position and get into the trachea, where it will cause extreme dyspnea, or it may go into the bronchus of the functioning lung, in which case sudden death ensues. One child died in this manner on its way to the hospital. Another such accident occurred in the hospital. This child would have died but for the fact that Doctor Tucker was in the ward at the time and performed an emergency tracheotomy, and fortunately found the bean above the level of the tracheotomy wound. After inserting the tracheotomy tube, he removed the bean through the larynx.

Types of foreign bodies include metallic, vegetable, and animal substances. Of the metallic group, tacks, screws, pins, safety pins, nails, staples, pieces of wire, ammunition, toys, pencil caps, collar buttons, dental and surgical instruments, tooth fillings, glass, coins, buttons, and pebbles, etc., are the more common. Of the vegetable, nuts, kernels, nut shells, beans, seeds, corn, cockle burs, prune pits, coffee beans, pieces of corn stalk, grass, apple stem, Job's tears, cork, cloth, rubber, etc., are those usually found. Of the animal, egg shell, bones, teeth, wax crayon, meat, fish, fragments of tonsil tissue, blood clots, etc., are the principal ones found.

In the roentgen ray examination of opaque foreign bodies it is best to make a thorough fluoroscopic study of the entire respiratory and alimentary tracts, as a first step, because when the foreign body is visible on the screen, immediate information is obtained; variations from the normal in lung function are seen; the roentgenographic procedure can be directed to the best advantage; and occasionally there are multiple foreign bodies in various locations. The roentgenograms should be of such quality as to show clearly the shadows of the larynx, the trachea, the bifurcation and the bronchi throughout the chest, even behind the heart and dome of each diaphragm. This requires rapid exposures in infants and children too young to follow instructions with regard to breathing. In adults it may be necessary to use the Potter-Bucky diaphragm to bring out the shadow of the foreign body behind the heart, the dome of the diaphragm, or in an area of dense pathology. Stereoscopic films are of definite advantage in finding a semi-opaque foreign body such as a root of tooth or a piece of bone.

Exposures must always be made exactly through the median line anteroposteriorly and in the true lateral direction with the involved side near the film, to determine the relation of the foreign body to the bronchial tree. Exposures in other directions are to be made when it is necessary to bring out the true size, shape, and arrangement of the parts of the foreign body. It is important to know whether there are sharp projections, if the foreign body is irregular in shape; the spread of the safety pin or staple, and whether or not points are bent. These findings determine the bronchoscopist's plan of procedure and selection of instruments.

Occasionally there is doubt as to whether an opaque foreign body, such as a coin or other flat object, is in the trachea or esophagus. This is decided by having the patient swallow a bit of barium mixture and making direct lateral exposures.

Nonopaque foreign bodies are mostly of the vegetable group, such as nuts, seeds, stems, shells, beans, corn, etc. As a rule, they produce more bronchial inflammation than the opaque type. They almost never cast distinguishable shadows so that the roentgen diagnosis depends upon the presence of obstructive emphysema, atelectasis, exudate, or tissue changes distal to the site of the foreign body. Here, again, the first step should be a careful fluoroscopic study, because one sees

repeatedly the entire respiratory cycle and notes the presence of a degree of obstructive emphysema that might easily be missed if the peaks of inspiration and expiration were not recorded roentgenographically. The presence of atelectasis, exudate, or tissue change is, of course, readily recognized fluoroscopically. In the presence of obstructive emphysema, the fluoroscopic view is indeed an interesting one. When the foreign body is in a bronchus, the unaffected lung takes in and empties its air, while the affected lung remains more or less distended throughout the cycle. The heart and other mediastinal structures are usually in normal position at the end of full inspiration, but during expiration they move to the side of the emptying lung. Sometimes this to and fro movement of the heart is most striking. The diaphragm on the well side has more than the normal excursion, while the diaphragm on the obstructed side either has much diminished excursion or may even show paradoxic movement. If there is doubt as to the presence of obstructive emphysema in one lung, it is advisable to ask the patient to take full inspiration and exhale as much as possible, or to make the quiet infant cry to bring about the same result.

After the foreign body has been removed, a moderate degree of obstructive emphysema may persist for a time because of the inflammation in the bronchus. The possibility of more foreign body should be kept in mind and if the signs increase or continue more than a few days the diagnosis is again positive.

When the foreign body is in the trachea and interfering with adequate expiration, obstructive emphysema is present in both lungs. At the fluoroscope it is evident that there is more than the normal amount of residual air present at the end of expiration. The heart does not move to and fro, but it does rotate so that at the end of expiration the heart shadow is narrower than at full inspiration, because the intercostal muscles force the chest wall to contract in an effort to get the air out of the lungs, and this in turn causes the apex of the heart to rotate anteriorly. Under these conditions there is limitation of motion of the diaphragm, or possibly paradoxic movement, on both sides. These signs vary with the degree of expiratory obstruction. In extreme cases the lungs are greatly overdistended, dyspnea is of an urgent nature, and if the foreign body is not removed the patient will die from exhaustion when he is no longer able to keep awake and exert conscious effort to get the air out of his lungs. I have seen children fall asleep with the bronchoscope in the trachea after the foreign body has been removed.

Now, as stated previously, if the obstruction of a bronchus is complete to inspiration, atelectasis will follow in a relatively few hours. In this event, the fluoroscopic view shows the affected lung uniformly dense, and the heart displaced to the affected side throughout the respiratory cycle. There is some to and fro motion due to the filling and emptying of the functioning lung and the expansion and contraction of the chest wall. The diaphragm on the involved side remains high and fixed.

If the foreign body is removed promptly, the atelectatic lung will resume normal function quickly; but if the collapse has been present for some days then it takes nearly as many days to expand fully again.

If exudate forms distal to the foreign body, the collapsed lung may fill up and resume its original size or even be overdistended. In this case the heart is in normal position or displaced to the well side. The lung then has the appearance of a consolidation or because of the extreme density may look like an empyema.

The roentgenographic technic in the nonopaque group requires very careful consideration of the following points:

1. Every exposure must be accurately through the median line in the anteroposterior direction. Only slightly oblique exposures may interfere with estimating the lateral displacement of the heart.

2. The exposures must be made in 1/20 of a second or less in those patients who can not or will not hold the breath as you wish.

3. Exposures must be made at as near full inspiration and complete expiration as possible. This requires some practice, but anyone can easily develop the knack of doing it. An exposure at the end of a prolonged crying sound will usually give a good view of expiration. The view at the end of expiration is the most important. It is sometimes necessary to make quite

a few exposures in order to get two that represent to a definite extent the two phases of respiration.

4. All exposures in a given case must be made with the same distance between tube and film, for then only can one compare the measurements of the chest, the size of the heart, and the position of the diaphragm. The chest has a narrower transverse diameter at the end of expiration than at inspiration. This may be the only evidence to distinguish between inspiration and expiration when very little air leaves the lungs at expiration.

A negative roentgen ray diagnosis should not be made on a single examination in the presence of a positive history and recurrent symptoms.

THE SURGICAL ASPECTS OF PEPTIC ULCER*

DONALD GUTHRIE, M.D.

Sayre, Pennsylvania

PERHAPS no field of diagnosis has progressed with greater rapidity or attained a greater degree of accuracy than that of gastro-intestinal disease. The patient now can feel secure in the opinion given as to whether he has or has not an organic lesion in any part of his digestive tract, but the treatment of these lesions is still a moot question—not as uncertain, however, as in the earlier days of gastro-intestinal surgery as practiced in this country. Several years ago there was no common ground upon which the surgeon and the internist could meet and discussions upon the question as to whether or not peptic ulcer should be considered a purely surgical or a medical question were always tinged with acrimony and, at times, with bitterness.

It is safe to say that a better understanding and a closer coöperation have come about since surgeons have become less radical and have realized that a certain percentage of peptic ulcer cases can be permanently cured by a strict medical regime and, also, since the modern internists have appreciated the benefits of modern gastro-intestinal surgery and have referred their chronic intractable ulcer cases for operation promptly and without hesitation. This coöperation and better understanding between the surgeon and the internist have greatly augmented the percentage of cures of peptic ulcer.

In no other field of abdominal surgery, with the exception perhaps, of lesions of the descending sigmoid, is the treatment less standardized than in that of peptic ulcer or where it is more important for the surgeon to approach the patient's surgical lesion with an open mind. The man who invariably employs the operation of gastro-enterostomy for all types of duodenal ulcer, or who employs a certain type of gastric resection for all types of gastric ulcer is bound to have a large number of unsatisfactory results. The age and condition of the patient, his mode of living, his race and occupation, his psychic reactions to his environment, the age and size of his lesion, its location, the amount of the gastric acidity and the probability of his adherence to a postoperative medical regime are all factors which the thoughtful surgeon should consider well before he decides just which type of operation offers this particular patient the best chance of permanent relief of his symptoms, and which will safeguard him from the possibility of a recurrence of his ulcer. As yet, we have no type of operation that is applicable to all cases.

A wide experience in the treatment of these patients, with a careful study, in the follow-up clinic, of the poor as well as the good results following operation, will be of great assistance to the surgeon in aiding him to decide the type of operation which will promise the given case the best result.

It is important for many of these surgical patients to undergo various periods of medical preparation before an operation may be safely performed. The patient with pyloric obstruction may require a prolonged period of gastric lavages and the administration of hydrochloric acid to render the operation safe. The dehydrated, exsanguinated patient or the one suffer-

*Read before the annual meeting of the Minnesota State Medical Association, Rochester, Minnesota, May 6, 1936.

ing from the results of prolonged starvation is in great need of rehabilitation by fluids, glucose, and blood transfusions. Here, coöperation with the internist is of untold value.

Duodenal Ulcer

In spite of all that has been said to the contrary, the operation of gastro-enterostomy is still a good one for chronic indurated ulcer. It is unfortunate that it has been accepted as a cure for all types of duodenal and gastric ulcer and it is more unfortunate that it has been employed in the treatment of ulcers of doubtful existence and for small early duodenal ulcers in young individuals showing no interference with gastric motility and with a very high gastric acidity. It is unfortunate also that this operation has been employed by surgeons whose qualifications to perform this type of surgery may be questioned.

It is far safer and much more permissible to treat the patient with duodenal ulcer medically than the one with gastric ulcer. Medical management, if the patient can be kept under strict and constant observation, should be given a thorough trial but the measure of success depends upon strict attention to the details of the plan. These patients should be acquainted, however, with the symptoms of massive hemorrhage and of acute perforation and they should be told what to do should the symptoms of either complication arise. All experienced surgeons now advise that medical treatment be given a thorough trial in all young patients having small duodenal ulcers with no obstructive symptoms and with a high gastric acidity. The nervous high strung patient whose symptoms are aggravated by an increase of a nervous strain and who runs a high gastric acidity, had better be treated medically, for any type of operation is wont to be followed by a recurrence of his ulcer or worse, by the development of a marginal ulcer.

The history of a recent case describes the uncertainties of the surgical management of a young patient with a distinct ulcer diathesis.

A boy at the age of fourteen developed symptoms of a duodenal ulcer and in 1926, at the age of eighteen, he was operated upon in another clinic for an acute perforation of a duodenal ulcer which was closed surgically. A brief period of relief was obtained, but in 1929 it was necessary to perform a gastro-enterostomy elsewhere. During the later months of 1934 his symptoms recurred and the pain was very severe at night. In the beginning of 1935 he was operated upon by a prominent surgeon who disconnected the gastro-enterostomy, closed the opening in the stomach, excised a portion of the jejunum containing a jejunal ulcer and closed the jejunum by an end to end anastomosis; a lateral anastomosis between the stomach and duodenum for a recurrent duodenal ulcer was then performed. After a brief period of relief, the symptoms recurred. He could not eat solid food and he vomited soon after taking any food or liquid. He entered this clinic in February, 1936, at which time roentgen examination showed a large ulcer had formed in the stoma of the gastro-duodenostomy and a marked degree of pyloric obstruction was present. Believing that a high gastric resection might protect him from further ulcer formation and relieve his present obstruction, this operation was advised and accepted with alacrity by the patient.

The approach to the pylorus was difficult and time consuming. A large ulcer 3.5 to 4 cm. in diameter, was found in the stoma of the pyloroplasty which had perforated into the under surface of the right lobe of the liver. Mobilization of the ulcer was impossible and as the patient's condition was not good, a rapid cholecystogastrostomy was performed (the benefit of a weak alkaline bath being hoped for) and a high jejunostomy for feeding purposes was established. This jejunal feeding is to be continued for six months or a year and will be successfully carried out, as the patient is most coöperative. He has been symptom-free for two months. Of course, a permanent cure cannot be promised and the patient understands the situation fully.

This case is cited to emphasize the uncertainties of the surgical treatment of patients of this type, who might belong to the class which Crile reports success by denervation of the adrenals. Their cure by accepted surgical methods is extremely doubtful.

If, after prolonged medical treatment, the suffering demands that an operation should be performed, we have had better success with the operation suggested and employed by Judd—that of local excision of the cap of the duodenum containing the ulcer, with two-thirds to three-fourths of the sphincter muscle and then performing a gastro-duodenostomy. It is important to remove this much of the sphincter muscle to eliminate pyloric spasm which favors a recurrence. This operation restores the normal continuity of the gastro-intestinal tract and protects the patient from the formation of a marginal jejunal ulcer. This is the purpose of the Finney, the von Haberer, the Wilkie, the Horsley and all types of pyloroplasty. Our experience is meager in all types of pyloroplasty except that recommended by Judd, but our results follow-

ing this procedure have been almost uniformly satisfactory. The operative mortality has been almost nil and the few unsatisfactory results have been found to be due to adhesions of the operative field to the liver or the parietal peritoneum interfering with the normal empyting of the stomach.

Gastro-enterostomy in this type of nervous patient just described is almost uniformly unsatisfactory. In order to perform the Judd operation safely, it is necessary to secure mobilization of the duodenum which has been accomplished in 50 per cent of the ulcer cases in our Clinic.

In the older patient, with a large duodenal ulcer of years' standing, with wide invasion and contraction of the duodenum, with interference with the motive power of the stomach or with pyloric obstruction and with not too high acids, the operation of gastro-enterostomy, correctly performed, offers the patient a splendid chance of permanent cure. This is borne out in the follow-up work in all Clinics where many of these patients are treated.

Balfour showed, in 1927, his results in operating upon 100 physicians, the average time elapsing after operation being eight and one-half years. This group was selected because it represented the chronic case in which the operation was clearly indicated and because physicians have difficulty in carrying out any postoperative regime which demands regularity in habits of living and eating. Posterior gastro-enterostomy was anterior gastro-enterostomy in 3 per cent, and gastro-duodenostomy in 2 per cent. There was complete relief in seventy-eight, or 87.6 per cent; incomplete relief in four; failure in four; and the need for a second operation in three cases.

In 1930, he reported upon the results of 500 consecutive cases of duodenal ulcer operated upon in 1918 and 1919. The results were based upon reports received a minimum of five years after operation. In 87 per cent the patients obtained relief which they had not been able to obtain by any other measures; in 69 per cent the relief was so complete that the patient paid no attention to habits or diet; in 18 per cent the results were classified as fair; and in 13 per cent the patient did not obtain any permanent relief from operation. Diseases overlooked at operation, failure to remove the appendix, functional disorders, marked indiscretions in habits and unwillingness to carry out a reasonable regime following operation were the commoner reasons for disappointment. The operative mortality in 500 cases was 1.8 per cent, there being nine deaths. There were twenty-one deaths (4.28 per cent) in the 500 patients within five years from all causes. From a standpoint of life expectancy, the Actuarial Society of America found the number of deaths among 500 persons of similar age and sex among the white population in 1910 to be thirty-one for a five-year period.

The treatment of acute perforation of a duodenal ulcer is, of course, immediate operation. The mortality rises rapidly with delay and after twelve hours is very high. The conservative school believes in treating the case as an emergency, closing the perforation and the abdomen with or without drainage and performing a secondary operation should the patient later develop obstructive symptoms. The radical school believes that gastro-enterostomy, after the perforation has been closed, is necessary or that pyloroplasty or pylorectomy are better operations for the condition. We have operated upon seventy-eight of these patients with a mortality of 26.9 per cent. Gastro-enterostomy was performed in but four instances, with a mortality of 50 per cent; the mortality of simple closure was 20 per cent. It was necessary to perform gastro-enterostomy in ten instances as a secondary operation, without mortality. Of the fifty-seven surviving patients in whom simple closure was done more than 95 per cent are well today or were well until their deaths from unrelated causes. We do not employ drainage in any patient operated upon within eight hours after perforation.

Massive hemorrhage is best treated conservatively. Few cases are lost under this plan since blood transfusions have been employed.

Jejunal Ulcer

The incidence of jejunal ulcer following gastro-enterostomy is a most controversial one. Its occurrence is reported to be from 1.5 to 52 per cent following gastro-enterostomy for duodenal ulcer. Moynihan reported an incidence of 1.6 per cent in 613 cases; Walton found it to occur in 1.2 to 3.2 per cent in two series of cases; Luff reports twenty-one jejunal ulcers (2.8 per cent) in 744 patients; Paterson found

it to be 2.4 per cent in a series of 495 operations; and Wilkie 3.5 per cent in his operations. The reports in this country are quite similar for the incidence varies from 2 to 5 per cent if Lewisohn's and Strauss' statistics are not included. Hinton of New York reported thirteen (16.4 per cent) jejunal ulcers in 79 patients who had gastro-enterostomies performed. Heuer collected reports from seventeen authors and found jejunal ulcer followed gastro-enterostomy in from 0.9 to 6.9 per cent of the cases, the average incidence being 3 per cent. The same author found recurrent or jejunal ulcer in from 0.6 to 6 per cent of cases, or an average of 1.9 per cent following partial gastrectomy.

The symptoms were formerly thought to appear within six months to a year after the original operation, but recent reports show that it is likely to occur many years after the gastro-enterostomy. However, over one-half the cases reported by Judd occurred within the first year following gastro-enterostomy in a series of 586 cases. Lahey, in 50 cases, found 50 per cent to develop within two years. He states, "In general it may be said that the longer the patient goes without ulcer symptoms following gastro-enterostomy, the less likelihood is there of the occurrence of a jejunal ulcer."

The author has recently operated upon two patients who developed jejunal ulcers—one six years after the gastro-enterostomy, the other twenty years after the original operation. This question needs further investigation directed upon older cases which have been classified as cured from reports from a too recent follow-up investigation.

The condition is not difficult to diagnose. A return of the former symptoms, usually without food relief and with the characteristic roentgenographic deformity, make the diagnosis usually certain. A certain few cases will respond to a strict medical regime, but the majority require operation which should not be delayed too long because, should a gastro-jejuno-colic fistula occur, the patient then must be subjected to one of the most difficult and dangerous operations in abdominal surgery. The reported incidence of this complication is from 8 to 10 per cent among jejunal ulcer cases.

Here again let me stress that it is the patient with what might be termed the ulcer diathesis who is prone to develop this distressing complication, and as a prophylactic measure, let me again warn against the use of surgery in the majority of patients of this type having the high gastric acidity and, further, the danger of employing the operation of gastro-enterostomy, should surgery be necessary after prolonged medical treatment.

Faulty technic, the wrong position of the stoma, the use of clamps and the use of non-absorbable suture material are no longer believed to favor the occurrence of jejunal ulcer, as was formerly thought. The radical operation of partial gastrectomy for duodenal ulcer has found little favor with American surgeons. The mortality of the operation of gastro-enterostomy performed by experienced surgeons is less than 2 per cent, while that of partial gastrectomy is from 5 to 8 per cent. The incidence of jejunal ulcer following partial gastrectomy is admittedly lower than that following gastro-enterostomy for duodenal ulcer, but, as the chance of cure following gastro-enterostomy is from 86 to 88 per cent, few American surgeons feel that the greatly added risk of the more radical operation is justifiable.

Gastric Ulcer

Prolonged medical treatment of the patient with gastric ulcer is fraught with much more uncertainty and danger than is the medical treatment of duodenal ulcer, in spite of the fact that the incidence of massive hemorrhage and acute perforation is lower in gastric than in duodenal ulcer. The danger of the ulcer becoming carcinomatous or becoming one of the penetrating type from a subacute perforation must always be kept in mind.

In discussing the incidence of carcinoma following ulcer, the writer realizes that he is opening up a most controversial question, but we are all agreed that carcinoma does follow gastric ulcer and, further, that carcinoma of the stomach is a great misfortune to befall any patient. It must be admitted, also, that it is extremely difficult to cure carcinoma of the stomach by surgery and that its occurrence should be prevented in all possible instances. There is still a heated academic discussion between clinicians and pathologists about the etiological relationship of benign ulcer and carcinoma of the stomach and the percentages reported are as low as 2 per cent and as high as 20 per cent. However, the more

experience we have with gastric ulcer the more convinced we are that it should be looked upon as a surgical problem unless the case gives an immediate satisfactory and continuous response to careful medical treatment. The clinician's responsibility is a heavy one for these patients as a class are floaters and unless the patient can be kept under strict and repeated observation the responsibility of treatment had better not be undertaken.

The size and situation of the ulcer in relation to the pylorus, the duration of the symptoms and the acidity are important points to consider before deciding whether it is safe to attempt medical treatment. The nearer the lesion is to the pyloric end of the stomach, the greater the chance of its being or becoming malignant. If the symptoms are of short duration, the ulcer well away from the pylorus, the acids not low and the patient intelligent enough to give the cooperation necessary, a medical plan may be instituted.

A plan which appears to be a safe and a rational one will be outlined. If, within two months, there has not been a marked diminution in the subjective symptoms, a marked decrease in the ulcer niche shown roentgenographically, and the disappearance of occult blood in the stools, the medical treatment should not assume the responsibility for the safety of the patient. Early ulcerating carcinoma might be temporarily benefited by a strict medical regime. Even should encouraging results be secured within a certain time limit, the conclusion that the lesion is not carcinoma has not been definitely eliminated. Strict adherence to the medical plan and continued improvement, supported by monthly roentgen-ray examination showing further decrease in the ulcer niche with the absence of occult blood in the stools, must maintain for at least a year.

If, at any time, there is a recurrence of subjective symptoms, a reappearance or enlargement of the ulcer niche, a return of the occult blood or a progressive low gastric acidity, the patient should be operated upon without delay. In gastric carcinoma, unfortunately, when the lesion has progressed to a degree that the subjective symptoms, the physical signs and the laboratory findings are unmistakable, the hope of cure has already vanished.

The real problem is not how many gastric cancers develop upon gastric ulcer, but how may we differentiate early ulcerating adenocarcinoma of the stomach from benign gastric ulcer; this is still a difficult and an uncertain one.

The ulcer near the pylorus may be treated by pylorectomy of the Billroth No. I or II type of operation; the saddle ulcer on the lesser curvature by a sleeve or V resection, a cautery excision with gastro-enterostomy, by a Polya or by a Polya-Balfour antero-colic resection. It is strange to note the infrequency with which jejunal ulcer develops in the stoma of a gastro-enterostomy performed for a gastric ulcer. This may be due, in part, to the lower gastric acidity seen in gastric ulcer than in duodenal cases.

Rare lesions on the greater curvature had best be viewed with great suspicion and an early operation advised, for the majority are malignant. Ulcer high up on the cardia which do not lend themselves readily to a safe resection may, at times, be relieved by putting the stomach at complete rest for several months, while the patient is fed through a jejunostomy.

The postoperative care of the peptic ulcer case is important and refined. One important thing besides support by fluids and glucose should be mentioned and that is the stomach must be kept empty should an ileus develop.

The gastric ulcer requires the same prolonged postoperative medical management as the patient who has been operated upon for duodenal ulcer. Diet, alkalies, discontinuing the use of tobacco and alcohol, rest periods and attention to foci of infection are important. Many more cures would follow operation if our patients would place themselves under the care of their physicians for a year or more after operation.

Let me urge that the surgeon and the internist coöperate more closely in the treatment of these cases preoperatively and postoperatively and let me caution the surgeon to approach each patient, having a peptic ulcer, with an open mind and to consider carefully all the characteristics of the patient and his lesion before he decides what type of operation is best suited to give the relief the patient has every right to expect.

THE TREATMENT OF DIABETES MELLITUS*

ELLIOTT P. JOSLIN, M.D.

George F. Baker Clinic, New England Deaconess Hospital

Boston, Massachusetts

DURING the last fifteen years there has been a gradual revolution in the problem of the treatment of diabetes, because there are so many more diabetics to treat and becaues they live so much longer. There are more diabetics to treat, half again as many more as shown by mortality tables, because the country is aging rapidly and thus approaching the maximum age of diabetic incidence—fifty to fifty-five years. Whereas, in Boston in 1845, 80 per cent of all the people died under the age of forty years, in Massachusetts, in 1935, 80 per cent of all the people died above the age of forty years.

We are detecting and diagnosing more cases. In Massachusetts, we have 15,000 diabetics and our incidence is a third greater than that in Minnesota, and why? Perhaps age is somewhat of a factor, but I think a more important reason is the discovery of cases hitherto unknown. And I believe in your admirable pamphlet on "Diabetes—How to Make it Harmless," if you should replace one-half of one of the twenty pages devoted to Diets with a few captions—

> Diabetes, like consumption, is most successfully treated if discovered early.
> Diabetes is hereditary.
> Does anyone in your family show sugar in the urine?
> Find out and if so call the doctor.

the incidence of diabetes in Minnesota would rise. Whether it would reach the Massachusetts level, I do not know, since diabetes, like coronary thrombosis, is less common among those doing heavy, laborious work and you have more working on farms than in factories and likewise, I presume, a less urban population.

Incidentally, in various other countries, diabetes is growing more rapidly than in the United States and eventually its incidence in these may reach our own. For example, in Italy in ten years, it jumped 82 per cent, from 4.5 per 100,000, in 1920, to 8.2 per 100,000 in 1930.

Now turn to the other factor which increases the number of diabetics in a community at any given time—namely, that dependent upon the duration of the disease. Of course, diabetics live longer today. Take the 1,243 living diabetic veterans studied by Matz. Already they have lived on the average of 9.1 years and those of you who are paying for those little Bonus Bonds in June can estimate whether they, with their present and future pensions, will live longer or shorter than you who provide them.

Undoubtedly, insulin is largely responsible for this increased diabetic life tenure, and this is best realized if one considers the diabetic child. Even as late as the first few years following the discovery of insulin, the life expectancy of the ten-year-old diabetic child was between one and two years as based on the life table of my then living diabetic children calculated by Dr. Louis I. Dublin of the Metropolitan Life Insurance Company, but next week, if you visit the Diabetic Exhibit of the American Medical Association, you will find it to be between thirty-one and thirty-two years! Present that fact to a diabetic and you will not need any longer to urge him to take insulin. (Incidentally, I hope you will not fail to visit that diabetic exhibit in which, as you may know, Dr. Wilder will play a prominent part.)

Diabetes—a Life Problem for Doctor and Patient

For present doctors, diabetes is a life problem and unless the doctor is very young, the diabetic will outlive him. It is for the doctor, when he is once consulted by a diabetic, to hold that patient for life, but how can he do it? This will only be possible if the doctor is able, during each visit of the patient, to demonstrate to him that he knows more than the patient does about the disease and to drive it home by telling him something new and helpful. This is not a light task, because the doctor must not only read his own medical journals, but the newspapers, too! The first thing I did this morning, on

*Paper presented at the annual meeting of the Minnesota State Medical Association, Rochester, Minnesota, June 5, 1936, with additional observations on the use of protamine insulin.

reaching Rochester, was to ask for this week's *Journal of the American Medical Association.* Could I appear before you without having read the diabetic articles it contained, particularly those from Minnesota? You can readily understand why I wander so much about the country after new ideas. I can't help it. I am chased, day by day, by my living diabetics and, unless I work very hard, kept awake at night by the thoughts of the 4,000 I have buried.

The 1935 Boston Diabetic Survey

In Boston, last year, 301 diabetic patients died. Females were more than twice as many as males. The average age was sixty-four years, in contrast to my diabetic doctors whose average age at death is sixty-eight years. I am thankful to say that no diabetic patient died in Boston during the year 1935 under nineteen years of age.

What are the lessons of the Boston Diabetic Survey as conducted by Dr. Lynch who investigated, personally, each diabetic death? First of all, it became plainly evident that for improvement in the treatment of diabetes in Boston we should concentrate upon the doctors rather than upon the laity. And when we found out that 165 of the 301 deaths took place in hospitals and, indeed, 141 in eight hospitals, we saw our task for 1936 was definitely prescribed and we representatives of those eight hospitals at once began to clean house. We met for dinner and a diabetic evening and discussed the thirty-six deaths, which had been selected from the total 301, because they appeared to be the least excusable. Each one around the table took his quota. We invited a surgeon to be present to comment on the surgical deaths.

Deaths from diabetic coma are needless and yet, in Boston during 1935, there were forty-one of these. I have new proof of the needlessness of coma deaths and it is based on my experience with diabetic doctors. Of my last thirty-two diabetic doctors to die only one died of coma! If doctors will not die of coma, why should their patients? Leaving aside those patients who died in their homes of coma we found that the treatment of diabetic coma in our various hospitals could be greatly improved. It really finally dawned upon us that a report from the laboratory, twelve hours after the coma patient had died, was not particularly useful in the management of his case, that often glucose was given instead of insulin and almost invariably the dose of insulin was inadequate. Not one of the hospitals represented by the group at the table was innocent. At the Deaconess Hospital, one patient, entered at midnight, lived 190 minutes and died without any insulin because all who saw him, including his wife, a trained nurse—doctors, house officers, supervisors—thought he was having an insulin reaction and the laboratory reports were slow.

Our conclusions upon the treatment of diabetic coma in the hospitals we represented became self-evident. Its treatment must be speeded up. This means prompt reports must be available from the laboratory by night as well as by day. No diabetics were burned up in Boston hospitals, in 1935. Of course not. We have fire drills. If we dont' want diabetics to die of coma in hospitals, we must have coma drills! Night or day we should be furnished the laboratory data upon our possible coma cases within sixty minutes of their admission to the hospital.

A word about the treatment of diabetic coma. First of all, don't let your patient get it. Teach him the cardinal rules—if he is sick from any cause: (1) to call a doctor; (2) to go to bed; (3) to take a hot drink every hour; (4) to move his bowels by an enema; (5) to keep warm; (6) to get someone to care for him, and, finally, (7) never to omit insulin while the urine contains sugar.

As for the medical treatment, it is the same old story—make the diagnosis and give insulin and enough of it. We give it every half hour, 10 to 100 units, according to the age of the patient, the severity of the coma, the duration of the coma and the diabetes. And if you do not wash out the stomach, gently, I allow, and your patient dies, do not hold yourself guiltless unless by autopsy you prove the stomach was not dilated. Naturally, you will administer salt solution for dehydration, 1000 to 5000 c.c. in twenty-four hours. Liquids by mouth, hot rather than cold, will be limited at first to 100 c.c. an hour; and when the blood sugar is falling and if the patient, at the end of twelve hours, cannot take nourishment, one should begin to give 10 per cent glucose intravenously or 5 per cent subcutaneously. With such methods we have lost one case of coma among 143 whose onset of diabetes was under the age of fifteen years. None of them has received alkalis or, indeed,

have we given alkalis to any patients since 1917, but we are open-minded enough to consider doing so if an appropriate case appears. Our oldest patient to recover from coma did so at the age of seventy-six years. I believe our total mortality for 318 cases is 11.9 per cent.

The second fact which stood out in our Boston series was the shockingly low number of autopsies. There were only twenty-one, of which sixteen were at the Deaconess. Minnesota does much better. Each fatal case of diabetes should be autopsied and each case of coma must be autopsied, because otherwise a doctor loses respect for his own treatment. Very frequently a death from diabetic coma is not due to coma *per se*.

State Medicine and Diabetes

I do not believe in it. To me, diabetes is a disease for the family doctor to treat in the patient's home. It is individualistic. It is not contagious, but it is hereditary and the family doctor knowing the family can find the new cases and begin to treat them early. He can advise about marriage and children. He knows two diabetic individuals should not marry and raise a family, because, theoretically, all the offspring would contract the disease, although it has been shown that only forty-four in each 100 would do so, because the others would die too soon from other causes to reach the age at which they were fore-ordained and predestinated to develop it. Furthermore, it has been estitimated by Pincus and White that 30,000,000 of the inhabitants of this country are hereditary carriers of diabetes anyway and I think it would be impracticable to sterilize them.

Obesity is the chief activating agent among hereditarily predisposed individuals in precipitating diabetes. This teaching is for the doctor to inculcate among the diabetic's relatives. It is especially important in Minnesota. Years ago, I found it took only nine of Dr. Wilder's diabetics at their maximum weight to weigh a ton, whereas, in Massachusetts, I often am shy a few pounds if I put ten on the scale. You might replace another half a page of diet in your committee's pamphlet with a few remarks on obesity.

Moreover, diabetes is a personal disease. The patient does well or poorly according to his own control of it. He needs an intimate relation with a doctor. He never will do as well if he goes to a dispensary and has a new doctor at each visit, each month, or even each year. He wants a doctor for life, just as much as his doctor wants a patient for life. He ought to see a doctor often and it is the duty of the family doctor to follow him up. My diabetics who die too soon are those, as a rule, who have not visited their family doctor or me. We must put our medical scruples in our pockets and aggressively urge our patients to keep under medical supervision. Although they will probably live on the average for twenty years, they must not neglect treatment. Diabetes is a disease to be respected from beginning to end and neglect to recognize this fact results in a premature death.

Diabetic Islands of Safety

Facilities for treatment should be afforded the general practitioner. He should have an opportunity, just as does a hospital doctor, to secure laboratory tests for, or at, cost for patients with restricted incomes. Laboratories should be subsidized by the state. Each doctor should consider in advance to which hospital he will send a case of coma or gangrene if he has not the facilities to cope with it and he should assure himself that the hospital in question be prepared to treat it efficiently and promptly.

Treatment—Education, Diet, Exercise and Insulin

The treatment of diabetes depends upon (1) education; (2) diet; (3) exercise; and (4) insulin. What I have said thus far relates chiefly to education and you and I are aware of the necessity of it. As to diet, we have barely emerged from a maze of intricate dietetics, but all of us now agree essentially on the division of carbohydrate, protein and fat because insulin has forced our hands. The carbohydrate should be approximately 150 grams, the protein should be adapted to the age, and the fat prescribed in amount sufficient for the caloric needs of the patient. The diet is very easily taught. A slice of bread is an ounce (30 grams) and contains about 18 grams carbohydrate and three slices in the day, 54 grams; a medium-sized orange weighs 150 grams peeled and contains about 15 grams carbohydrate and for three in the day, allow 45 grams; all the 5 per cent and 10 per cent vegetables a diabetic would desire seldom would exceed a content of 20 grams and this

would be the same as a very liberal saucer of a cereal; a gill of milk (4 ounces—120 grams) contains 6 grams and of cream, 4 grams, or a total of 10 grams carbohydrate thus making, with the bread, oranges, vegetables and cereal, a grand total of 150 grams. Substitutions are easily learned.

As to the use of regular insulin, I have nothing to add to what I have recorded either in my books or as published in the *Journal of the American Medical Association* last year, in the official series of articles upon hormones. I would emphasize, however, the insulin prescription which is so useful at the time of surgical operations or in the presence of an infection. In the numerator, designate by initials the qualitative amount of sugar: red, orange, yellow, green, or blue and in the denominator below each initial the quantity of insulin to be injected 20, 15, 10, 5, 0 units, and regulate the frequency of administration so as to keep the patient sugar free.

$$\text{℞}\ \frac{\text{R}\ \ \text{O}\ \ \text{Y}\ \ \text{G}\ \ \text{B}}{20\ \ 15\ \ 10\ \ 5\ \ 0}\ \text{every 6 hours}$$

Exercise deserves a more extensive mention. Without it the diabetic is handicapped, but with it the control of the disease is simplified, provided along with it he has enough insulin. But insulin he must have and if he cannot manufacture sufficient of his own, he must buy it. Without insulin the blood sugar of the severe diabetic will rise with exercise, but give him insulin and it will fall as in the case of the normal individual and he will utilize his carbohydrate far better than if he is at rest. Diabetics should work, but if their diabetes is severe, they need insulin to help them to do so.

Protamine Insulin.—The discovery of protamine insulin by Hagedorn of Copenhagen is another revolutionary step in the treatment of diabetes. Clinicians were so overwhelmed with gratitude and satisfaction for the original discovery of insulin, in 1922, by Banting and Best and their co-workers, that few attempts were made by anyone to alter its character. Hagedorn's work, therefore, really is epoch-making. He has demonstrated that it is possible to improve treatment with insulin by prolonging its action and lessening the liability to a sudden lowering of the blood sugar with its embarrassing sequence of symptoms. I have no hesitation, therefore, so far as my own groups of cases are concerned in recognizing the contribution of Dr. Hagedorn by naming the present era for him as I have already designated various eras since I began practice; namely, the Naunyn Era, 1897-1914; the Allen Era, 1914-1922, and the Banting Era in three divisions, Early, 1922-1925; Middle, 1926-1929; Later, 1930-1935.

Through the courtesy of your officers and the Editors of MINNESOTA MEDICINE, and the *New England Journal of Medicine*, I am able to rearrange the remarks which I made on protamine insulin before your association, so that duplication may be avoided. It so happens that on the same day I spoke before you, my associate, Howard F. Root, presented before the Association of American Physicians a similar paper which has since been published, with additions, in the *New England Journal of Medicine*. This manuscript, therefore, now includes the Introduction to the original paper and the sections upon the Indication for Use of Protamine Insulin and the Conclusions regarding its use, with comments upon the above and represents the opinion of my associates and myself, based upon over 245 cases and as of July 1, instead of April 1, 1936.

The following case reports are illustrative:

Case 1.—Eleven-year-old B. W. showed 10 per cent of urinary sugar upon the morning following the discovery of his diabetes and began the use of protamine insulin forthwith. Thirty units were given before breakfast on the first day, 50 units on the second, third and fourth and upon the fifth day, the urine was sugar-free although the patient had received in the previous twenty-four hours, 210 grams of carbohydrate and 1900 calories. He had no reactions and eleven days later while at home was sugar-free with a normal blood sugar. By that time his insulin had been reduced to 24 units before breakfast. It is true he was a fresh case and a child, but contrast this experience with the inauguration of treatment with former methods.

Case 2.—Mrs. S., a nurse thirty-six years old, so crippled with rheumatoid arthritis that exercise was impossible in the treatment of her diabetes of one year's duration, weighed eighty-four pounds in July, 1935. To control her diabetes she required insulin in enormous amounts, given in four to six doses daily for six months. At one time she took as high as 530 units a day. Since January she has shown improvement, her weight has risen to 117¼ pounds and the insulin was decreased to 240 units administered before meals and on retiring. On January 23 she began protamine insulin and now in April her diabetes is equally well controlled

with insulin once daily, 120 units of the old and 120 units of the new.

Case 3.—R.'s parents told me (E. P. J.) that since her severe reaction ten years ago they had not dared to let her sleep alone. This last autumn, the week after entrance to a college in Boston while at lunch with her mother at a restaurant, she had a reaction so violent that it was necessary to call an ambulance and remove her to a hospital. Immediately she began protamine insulin. Her mother says, "Since R. commenced protamine insulin she has had no reactions. She sleeps alone. You cannot tell, Dr. Joslin, what protamine insulin means to her father and me."

The indications for use of protamine insulin.—

1. A trial should be made with diabetic patients of recent onset, because it is probable that such patients can be controlled with a single daily dose of protamine insulin from the beginning of treatment. Indeed it is our impression that we will never learn what protamine insulin can do until we use it as a remedy *sui generis* and observe patients treated with it exclusively over a period of years.

2. High fasting blood sugar values are a definite indication because of the great advantage to a diabetic in beginning his day with the nearly normal metabolism indicated by a normal blood sugar.

3. Multiplicity of dosage can be avoided by the use of protamine insulin, and the consequent gain in simplicity and convenience of treatment improves the end-results.

4. Sensitivity to insulin as indicated by frequency of reactions constitutes the fourth major indication.

5. Hepatomegaly is an indication, because of the efficacy of protamine insulin in reducing the size of the liver, reported by Hanssen.

6. Lipodystrophy may be favorably affected by the reduced number of injections and lessened acidity of the preparation.

7. Finally, it may prove to be of especial value in mild diabetics, in patients with hyperlipemia, cardiac cases in whom hypoglycemia should be avoided and for the same reason where there are occupational hazards.

Conclusion

With protamine insulin the fundamentals of treatment of diabetes are not changed, but the ideals of treatment are more nearly achieved. Diabetes today is a disease to be respected and neglect to do so spells disaster. Diet and exercise are as essential as ever. The patient must not overeat, but it seems likely that having determined the insulin dosage for a given quantity of carbohydrates, the protein can be determined by adjustment to the age and size of the patient, the fat regulated by body weight, and even the carbohydrate can vary ten to twenty per cent up or down with comparative impunity.

The simplicity of administration of insulin in one or two doses instead of two, three, or four doses will appeal so generally to patients that the probability is strong that the number of diabetics taking insulin will increase. As a result, the percentage of deaths from coma should fall at an accelerated pace.

The original hope that protamine insulin would be safer, because of the lessened number and severity of insulin reactions which it engenders, has been confirmed.

Addenda

All that has hitherto been said we now not only confirm but wish to record that we are still more enthusiastic about protamine insulin than we were before, can state positively that we have had no new untoward effects, have not observed allergy in any case save the one reported, and concerning that we still have some doubt, and are definitely of the opinion that it is desirable to use protamine insulin more extensively.

Protamine insulin is most easily employed when a diabetic of recent onset comes for treatment. The patient, Case 1, reported above, has continued to do remarkably well, returning to the office July 1, showing no glycosuria, a blood sugar of 0.13 (130 mgs.) per cent during the afternoon and is in perfect condition. His weight has risen from 98 pounds to 102. The attitude of the mother and of the child toward the treatment of diabetes is almost as different from children started on regular insulin with one, two, three or four doses a day, although that method was wonderful, as was the difference in the attitude of the parents of those children from the parents of children before 1922.

The simplicity of treating a fresh case of diabetes is so much greater than changing from old to new insulin that we advise any physician to become acquainted with protamine insulin by using it first with a hitherto untreated diabetic.

When a recent case of diabetes is to be treated

with protamine insulin one should forecast the eventual diet, which would be for the average adult approximately carbohydrate 150 grams, protein 70 grams and fat 90 grams, and then adjust this to the age, weight and occupation of the patient. One would underfeed rather than overfeed the patient, but we are inclined to keep the carbohydrate at the start only a little below the final figure we hope to obtain. The patient is then given before breakfast whatever dose of protamine insulin seems indicated, and within a few days changes in the dosage should enable the doctor to obtain a sugar-free specimen in one of four periods, morning, afternoon, evening or night. So soon as a sugar-free specimen is obtained in one of these four periods one can then adjust the distribution of carbohydrate between the three meals and the lunches in the forenoon, afternoon, or before retiring, so that the carbohydrate load may be lessened at one time of the day where it is not well borne and transfer it to another in which apparently it can be utilized. As a rule, it has been our practice to give one-fifth of the carbohydrate at breakfast and two-fifths at each of the other meals, but we do not hold so rigidly to this with protamine insulin, although in general we have adhered to this principle.

From the above it is evident that protamine insulin makes it still easier than with regular insulin, to give a patient the diet thought to be ideal, although that was quite possible, and if I understand rightly was the method employed especially by R. D. Lawrence in London.

If glycosuria and hyperglycemia persist one simply increases the protamine insulin up to the stage of sugar-free specimens or an approaching insulin reaction.

If glycosuria nearly or wholly disappears in all specimens save the forenoon specimen one would give regular insulin along with the protamine until a normal blood sugar is obtained although always attempting to secure the same object by making transfers of carbohydrate in the diet to adjust it to the insulin dosage. If with or without the aid of the addition of regular insulin to protamine insulin before breakfast, the night specimen continues to show sugar, the indication is to increase the protamine insulin, because we know that protamine insulin will act even longer than twenty-four hours.

If all specimens are sugar free, one obviously reduces the insulin, protamine or regular and protamine combined, by about two units not daily unless in danger of a reaction, but every two or three days and adjusts carbohydrate from one time of the day to another so as to avoid an insulin reaction. If the reaction occurs before noon, naturally the regular insulin is the type to be lowered, but, if the reaction occurs from late afternoon on, the protamine insulin would be the logical type to decrease.

The life of patients in hospitals is far less strenuous than outside and therefore the greatest caution must be given patients on discharge. They must not change the amount of exercise suddenly. Gradually during one or two weeks they should increase it and adjust, probably lowering, the quantity of insulin which they take. The bad reactions we have encountered with protamine insulin have been due largely to neglect of this rule. They are not the fault of protamine insulin, but merely indicate the need for the patient to understand the management of his disease.

All sorts of minor troubles develop with the administration of insulin, old or new, but in general these represent lack of understanding of the management of the diabetes at the particular time. More than ever it is true that the diabetic with knowledge and common sense is the one who will do the best.

Reactions do occur with protamine insulin even if regular insulin is not also employed. They may persist for hours. Case 10268, aged 10, with diabetes of five years' duration left the hospital on May 4, 1936, taking 16 units of regular insulin plus 40 units of protamine insulin at one time before breakfast in the morning (no other insulin during the day). He had done well on this schedule at home, in fact so well that with increased physical activity on his part, his mother had been obliged to lower his insulin dosage in stages to 14 units of regular and 28 units of protamine insulin a day in order to avoid hypoglycemic attacks.

On the morning of July 4 he was unusually active and became so interested in his fireworks that he forgot to take at 10 a. m. the customary 100 c.c. portion of orange juice. At about 11:45 he was found unconscious and in convulsions. His parents were unable to get him to take significant amounts of carbohydrate by mouth and

no improvement was seen after the subcutaneous injection of 1 c.c. of a 1:1000 solution of epinephrine. He was brought in an unconscious state to the Deaconess Hospital at 1:30 p. m. Particularly after stimulation, as by attempts at arousing him, convulsive twitchings of the muscles of the extremities and face were well-marked. The Babinski sign was bilaterally positive. The blood sugar on admission was 57 milligrams per 100 c.c.

During the course of the afternoon three intravenous injections of 20 c.c. of 50 per cent glucose were made at intervals and some 500 c.c. of orange juice and ginger ale were given orally in divided amounts. Despite this, convulsive twitchings were present or could be elicited up until 5 or 6 o'clock in the afternoon. Consciousness to the extent of answering questions was not regained until about 9 p. m. This slow return to normal was all the more striking because of the relative mildness of the hypoglycemia as judged by blood sugar values. These were 1:30 p. m. (on admission) 57 milligrams per 100 c.c. and 4:00 p. m. 72 milligrams per 100 c.c.

An additional point of interest is that on two occasions during the afternoon, after the intravenous injection of glucose, the Babinski sign became definitely negative after having been bilaterally positive.

It is probably not necessary that the new preparations of protamine insulin be kept constantly in the refrigerator. It is almost certain that the new preparations will keep after mixture for two weeks and possibly for months. Recently Dr. Marble of our group demonstrated that the zinc and calcium-containing varieties, furnished us by the Eli Lilly Company, maintained better suspension at room temperature than did the regular protamine insulin.

Protamine insulin has come to stay, and it is a boon to the diabetic.

DIAGNOSTIC PROBLEMS IN RENAL-URETERAL DISEASE*

ALBERT E. OLSON, M.D.
Duluth, Minnesota

SOMETIME ago, I was agreeably surprised to find that I had a series of renal and ureteral cases, interesting from a diagnostic standpoint. A review of the literature proved that diagnostic problems in this field are not new.

An oft-repeated statement, which emphasizes the deceptive nature of diseases of the kidney and ureter, is that one of the first things to do in the treatment of kidney stone is to remove the appendix! Kelly, Lowsley and Braasch[21] have reported, at various intervals, that from 30 to 65 per cent of patients with right-sided renal-ureteral lesions have had one or more prior futile operations. Cecil[12] stated that 30 per cent of observed cases of hydronephrosis had previously been explored abdominally. Colby[14] remarked that "disorders of the urinary tract may be so suggestive of lesions of the gastro-intestinal tract that the correct diagnosis is obscured." Leon Bloch,[4] the Chicago gastroenterologist, in an excellent review of his cases, showed that the gastro-intestinal manifestations of diseases of urologic origin were varied and many. Finally, Gregg remarked that "all of us have seen battle-scarred abdomens that have had first the appendix removed, then the tubes and ovaries and, lastly, the gallbladder sacrificed, while the pain still remains." It is, therefore, evident that obscure symptoms of renal-ureteral disease, have an historical background which emphasizes their frequency and importance.

To further check the deceptive nature of renal-ureteral lesions, I reviewed a group of eighty cases entered at St. Luke's Hospital during the last five years. These cases did not include the so-called medical diseases. They were a select group in which the surgical side was emphasized and in which the hospital records were quite complete (Chart 1).

This chart emphasizes the fact that in a general hospital most cases are now well studied. It also shows that in most cases, one or more symptoms are present which definitely point to the kidney or ureter as the seat of pathology.

*Read before St. Louis County Medical Society, May 14, 1936.

CHART I. REVIEW OF EIGHTY ST. LUKE'S HOSPITAL RECORDS

Symptom	Renal and ureteral stone	Polycystic kidney	Nephroptoses	Tubercular kidney	Hydronephroses	Traumarupture	Tumors	Pyenephroses	All kidney conditions	Per cent %
Number of cases	47	2	2	10	5	2	7	5	80	100
Pain definitely over kidney region	34		2	3	4	2	2	4	51	64
Pain radiating to genital region	25			2	2	1		2	32	40
No pain	1			1			2		4	5
Mass palpable		1					5		6	7.5
Urinary symptoms										
Hematuria	33			1	1	2	2	1	40	50
Dysuria	36		1	5	2	1	2	2	49	61
Frequency	36		1	6	2		6	4	55	69
Gravel	2								2	2.5
No urinary symptoms	9				2				11	13
Cases with *no* diagnostic findings		1			1				2	2.5
Laboratory findings:										
Urine										
RBCS	34	2	2	7	4	2	6	3	60	75
WBCS	28	2	2	5	3	2	7	3	52	65
Blood (white count)										
Over 10,000	43	2	2	5	5	2	5	5	69	86
Over 15,000	16	2			5	2	3	5	33	41
X-rays taken	38	2	2	6	5	1	7	5	66	82
Cystoscopic done	33	1	2	5	5	1	5	5	57	71

Since only 2.5 per cent of all the cases had no findings referable to the genito-urinary tract, one must conclude that confusion in diagnosis must be due to other factors.

Sanford[39] discusses the need of careful urinary tract investigation in all cases of obscure abdominal pain, where the emergency sign is discarded. He also states that since urgent surgical cases are in the minority, one can usually take time to study the urologic side, with instruments of precision. In a great majority of the latter, one can definitely state that a lesion is or is not in the kidney or ureter.

In this series, fifty-eight of the eighty cases were right-sided and twenty-eight cases (35 per cent) had had prior abdominal operations such as appendectomy, cholecystectomy, and various operations on the uterus and adnexa. As a whole, the chart demonstrates an increasing tendency on the part of the doctors of this section to consider the kidney quite carefully themselves or in consultation with urologists.

From a review of our cases and of the literature, confusion in diagnosis due to unusual features of renal-ureteral disease, may well be studied in four main groups, any combination of which may be present in a single case: (1) the general symptoms may overshadow the local signs of disease; (2) deceptive anatomical derangements and relationships may be present; (3) confusion may result from extra-renal and ureteral nervous manifestations; (4) absence of many or all of the key symptoms, including obscure cystoscopic, x-ray and laboratory findings, may lead to diagnostic errors.

In discussing the first group, I shall not concern myself with the purely medical aspects of the subject, such as the edema of the gastro-intestinal tract in acute nephritis, the hemorrhagic infiltration in chronic nephritis and the diarrhea, vomiting and coma of uremia.[17] I shall briefly review the diagnostic pitfalls of pyelitis, perinephritic abscess and renal lithiasis. General symptoms, of course, can predominate in almost any disease of the kidney or ureter and these instances are cited because of their known tendency to cause confusion in surgical diagnosis.

The conclusions of Lincoln[26], in discussing the divergent symptoms of pyelitis, are as follows: (1) pyelitis must be suspected in any unexplainable febrile condition in children; (2) it should always be excluded in acute abdominal conditions, especially appendicitis; (3) it must be

borne in mind, that appendicitis and pyelitis may coexist; (4) the early diagnosis of pyelitis may be difficult because at first there may be no urinary symptoms or even pus in the urine. Added to the above is the fact that chills, fever,

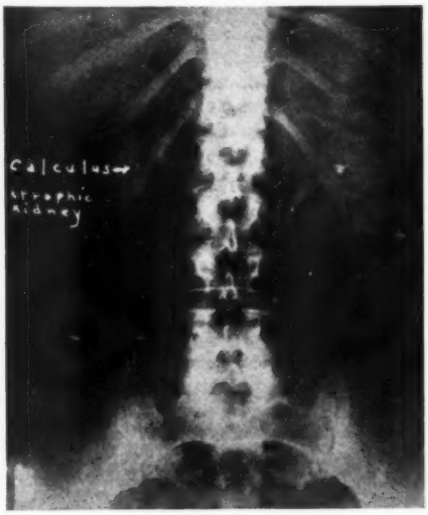

Fig. 1. Intravenous urogram showing non-functioning atrophic right kidney with calculus and hypertrophic left.

indigestion, nausea, vomiting or paralytic ileus may be so pronounced that attention is directed to other than kidney conditions.

Perinephritic abscess may produce general symptoms which are as uncertain in origin as those of pyelitis. Since only 42 per cent are due to kidney lesions, the multiple etiology factor must not be forgotten. Rolnick and Burstein[37] state that it is relatively uncommon disease, only an average of eleven cases a year being noted in one of the largest general hospitals in the world (Cook County Hosiptal). They further state that acute lesions can usually be diagnosed by their intermittent fever and loin pain. Subacute and chronic lesions, however, are often confusing because they may present no other finding, early, than intermitten fever. They emphasize the value of diagnostic puncture as most important in their series of fifty-five cases.

The following case illustrates that accurate diagnosis is often impossible because of the severity of the general symptoms:

Mrs. C. E., aged fifty-five, was admitted to St. Luke's Hospital on June 29, 1935, in a somewhat stuporous condition. At this time her temperature was 100°, pulse rate 64, respirations 22, blood pressure 190/100, and the white blood count was 17,400. Urinalysis revealed 4 to 6 leukocytes and 6 to 8 erythrocytes per high power field as well as a trace of acetone. Unable to obtain an adequate history, the physical findings suggested the following diagnosis by the intern: "Coronary heart disease; acute congestive heart failure, with moderate pulmonary edema; hypertension."

From relatives it was later ascertained that she had suffered from typhoid fever thirty-five years previously. During the past twenty-five years, complaints of bloating and indigestion after meals were common. Moreover, intermittent attacks of acute abdominal pain, localized mainly in the gallbladder region and accompanied by nausea and vomiting, were noted. Several hours before entering the hospital, the patient had such an attack but more severe than others and she didn't seems to 'snap out of it.' Treatment over a period of years had been given for high blood pressure, heart trouble, gall bladder disease and nervousness.

Two days after admittance she developed a rectal temperature of 107°, became cyanotic, dyspneic, irrational and almost expired. Complete anuria followed and blood nitrogen readings were increased, the creatinin being 3.3 and urea 59. She remained critically ill for several weeks with abdominal distention, occasional vomiting and marked tenderness over the gallbladder. She was too ill for x-ray studies, but as urinary secretion increased and the blood nitrogen dropped to near normal, a marked pyuria was noted. At this time, superficial pyemic abscesses developed over the body.

About one month after the onset, she passed a "shower" of small stones during urination. It is known that multiple vesical calculi are sometimes passed by patients who have been bedridden a long time and that in the male they may arise from the prostate. In this case, intravenous urograms (Fig. 1) revealed an atrophic right kidney with calculus and a hypertrophic left kidney. Cholecystography revealed a non-functioning gallbladder.

This case illustrates that it is difficult to focus attention on the kidneys when the general symptoms are extreme. However, it also shows that a history of hypertension, heart failure and pulmonary edema is consistent with long standing renal lesions. The coexistence of pyelonephritis, renal calculi, collapse following pyemia, reflex anuria and cholecystitis, of course, confused the clinical picture.

From the foregoing discussion it is apparent that general symptoms in renal-uteral disease may result from shock, insufficient elimination of blood nitrogen, or from the toxicity attending acute febrile states.

Differences in diagnosis may result from anatomical abnormalities of the kidneys, which pro-

duce various symptoms. Anomalies in structure, size, number or position, probably constitute the noblest alibi for incorrect diagnosis in renal-ureteral disease. The following case is an interesting example:

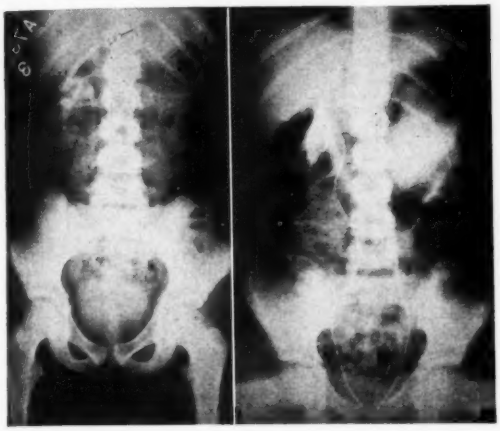

Fig. 2 *(left)*. Intravenous urogram—non-functioning left kidney (aberrant vessel).
Fig. 3 *(right)*. Retrograde pyelogram. Large hydronephrotic left kidney due to aberrant vessel.

L. N., a nine-year-old girl, was first examined by us on July 10, 1933. Since infancy she had a history of repeated attacks of bloating, nausea and vomiting and left abdominal pain. During 1932 and 1933 the attacks became more frequent and severe. They were not accompanied by pain in the left iliocostal space nor by urinary symptoms. The attacks would last from a few hours to two days. The only treatment which afforded relief was hot applications and repeated enemas. Examination at this time was essentially negative except for moderate distention and tenderness on palpation over the upper left abdomen. Temperature, urinalysis and blood chemistry readings were quite normal. Following another acute colic, the left kidney was definitely palpable. An intravenous urogram showed a non-functioning left kidney and retrograde pyelograms showed a left hydronephrosis (Fig. 3). Functional tests were normal on the right but showed delayed or absent excretion in the left kidney.

At operation (Fig. 4), an anomalous artery to the lower pole was found, causing constriction of the ureter just below the pelvis. The latter was greatly dilated and the kidney was enlarged. Left nephrectomy was performed and there have been no recurrent attacks since.

As a rule, most displacements of the kidney cause no symptoms. One must differentiate between "movable kidney" which moves too freely behind the peritoneum, "floating kidney" which is surrounded by peritoneum and suspended into the peritoneal cavity and, lastly, misplaced kidney.[8] The latter is not freely movable and may be situated either in the pelvis, at the sacral promontory or at the bifurcation of the aorta.

Due to the loose outer capsule, the kidney

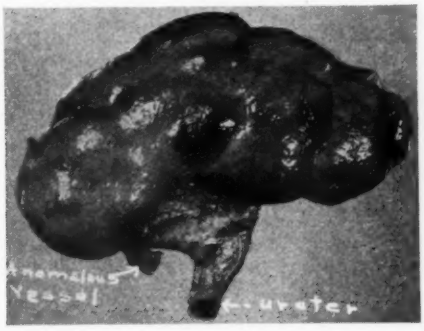

Fig. 4. Left hydronephrotic kidney with aberrant vessel to lower pole.

is movable within certain limits. It has no special ligament to keep it in place and depends for its support upon its fatty cushion, its vascular pedicle and upon intra-abdominal pressure.[8] Emaciation may lead to loss of the fatty cushion and facilitate displacement.[6] It is often difficult to evaluate symptoms diagnostic of renal ptosis because many of these patients have no complaints whereas others are not relieved by operation.

W. J. Mayo and A. C. Johnson[20] state that from January, 1910, to June, 1926, twenty cases of ectopic kidney were seen at the Mayo Clinic. The symptoms were backache, lower anterior abdominal pain and rectal and vesical tenesmus. Attention is again called to the fact that by its abnormal location, it is without the "fatty cushion" protection and is more susceptible to various pathologic changes.

Chute[13] cites several cases showing the effect of direct extension of inflammation in producing unusual symptoms in adjacent organs. He concludes that "intestinal symptoms were due to atrophy of the fatty capsule and the binding pain, to adhesions between the colon and the displaced kidney."

Miss A. H., sixteen years old, came to us because of pain in the right lower quadrant of the abdomen. She thought she had appendicitis. Examination revealed a fixed mass, fist sized and moderately tender, located at the brim of the pelvis. The accompanying pyelogram

(Fig. 5) verifies the position of the kidney. The size, functional tests and urinalysis were quite normal. The patient was told of her anomaly and except for advising further observation, no treatment was given.

Fig. 5. Retrograde pyelogram—misplaced right kidney.

A similar left-sided displacement was noted in a twenty-four-year-old male. He came to us because of a lump in the left lower abdomen which became larger and more painful at times. He stated it was movable and that he first noticed it six years before. His main complaints were bloating, constipation and the fact that steady work was impossible because exercise or wearing a belt over the "lump" caused considerable discomfort. Relief was obtained by resting, especially lying down. There were no urinary symptoms.

Examination revealed a fist-sized tender mass to the left of the sacral promontory (Fig. 6) which was somewhat movable. A barium meal and enema proved that it was outside the gastro-intestinal tract. Retrograde pyelograms (Fig. 7) revealed a misplaced left kidney, the catheter being obstructed a short distance from the orifice. Functional tests and urinalysis were normal. The patient is under observation.

Berkman and Priestly[2] refer to a group of cases in which postural change is of diagnostic importance. These patients usually complain of atypical abdominal pain and the authors state that hydronephrosis was found to be the cause. They state that "unexplained, one-sided abdominal pain, which is aggravated by walking or standing and relieved by reclining, should undergo thorough urologic examination."

In tumors of the kidney, pain is not an out-

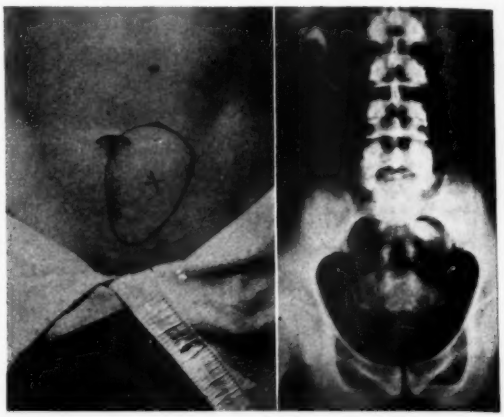

Fig. 6 *(left)*. Outline of movable tumor (kidney).
Fig. 7 *(right)*. Intravenous urogram of Figure 6—ectopic left kidney.

standing symptom, except when the tumor itself or hemorrhage from it causes obstruction. According to Harrell,[21], the diagnosis is usually based on hematuria and a palpable mass. In our series, five out of seven had a palpable mass and six showed red cells in the urine.

In embryonic nephroma, enlargement is an outstanding symptom. Prather and Crabtree,[35] in a study of 200 cases, state that it occurs usually before the age of three, that a mass is noted in 80.1 per cent of cases, hematuria in 14.5 per cent, and pain in 5 per cent.

Geshickter and Widenhorn[81] found that 92 per cent of malignant tumors are found in the renal cortex and the most common of these is the malignant nephroma (hypernephroma). These authors further state that they are characterized by occurring in patients over fifty years of age, by early metastases to bones, by enlargement and pain in the flanks and often by hematuria. Pressure on surrounding viscera, therefore, does not seem to be an outstanding feature of kidney tumors.

Pain in the back and flanks with pyuria and fever, but without hematuria or palpable enlargement, was noted in a well studied case by Dr. W. G. Strobel.

The patient, a man, sixty-eight years of age, gave a history of a previous attack of pain in the back and

right side, four years before. He was ill four days and the pain was noted only in these two places.

Twenty-four hours before entering St. Luke's Hospital, he had a recurrence of similar symptoms. At

Fig. 8. Malignant nephroma with pyelonephritis.

this time, urinalysis showed an occasional erythrocyte, moderate pyuria and albuminuria. Because of the pain, mild temperature elevation and a white count of 12,700, it was extremely difficult to know whether the patient had a pyelonephritis, perinephritic abscess or retrocæcal appendicitis.

Removal of the right kidney by Dr. Strobel (Fig. 8) showed that it contained several prominent rounded nodules in the lower pole and weighed 300 grams. Evidence of a secondary pyelonephritis was sufficient to account for the general symptoms. The possibility of infection accompanying tumor formation and the fact that hematuria and enlargement may not always accompany malignant nephroma, is well illustrated in this case.

The following case report is an example of large abdominal tumor mass, with pressure symptoms due to polycystic kidney:

Mr. A. R., thirty-five years old, consulted us first on February 11, 1935. His complaints were enlargement of the abdomen, a sense of pressure and tenseness, as well as weakness and shortness of breath. The swelling was first noticed in July, 1934. There were no symptoms of dysuria or frequency. Blood nitrogen readings were normal. Urinalysis showed 2 plus albumin and pus.

Intravenous urograms showed no filling of the left kidney or ureter. The right renal shadow and pelvis was enlarged. Retrograde pyelograms failed to visualize the left pelvis, even though considerable sodium iodide was injected into it (Fig. 9). Our diagnosis was polycystic kidney and the accompanying photograph (Fig. 10) shows the tumor mass some-

Fig. 9 *(left)*. Retrograde pyelograms—polycystic kidneys.

Fig. 10 *(right)* Lateral view showing abdominal tumor with sinus, following rupture of several cysts in the left kidney (polycystic kidney).

what reduced in size after nephrostomy and puncture of several cysts.

Polycystic kidneys are not always bilateral as demonstrated in the following case:

Mr. G. O., forty years old, entered the hospital on August 9, 1933, with a tentative diagnosis of chronic nephritis, hypertension and uremia.

The history showed that he had been ill two weeks, complaining of shortness of breath and swelling of the legs, face and hands. One week prior to admittance, he became drowsy and slept considerably. Prior history elicited the fact that he had albuminuria and a blood pressure of 180 as early as eleven years before.

Examination on admittance revealed a dyspneic, edematous patient who was too ill to be well studied. During the first twenty-four hours, only 5 c.c. of urine was excreted. On the next day there was complete suppression, with great increase in the blood nitrogen. Three days after admittance, he expired. The postmortem specimen (Fig. 11) showed a right polycystic kidney (1005 gms.) and an atrophic arteriosclerotic left kidney.

Polycystic kidneys occasionally assume great size and are usually bilateral. Most of these patients develop symptoms requiring medical attention, between the ages of thirty-five and forty-five. Abdominal tumors, in contrast to pelvic tumors, often attain a large size without

producing pressure symptoms. One must always keep in mind sclerotic kidney, atrophic kidney and autonephrectomy alone or in combination with disease or deformity of the opposite kidney, in explaining some of the fulminating uremias.

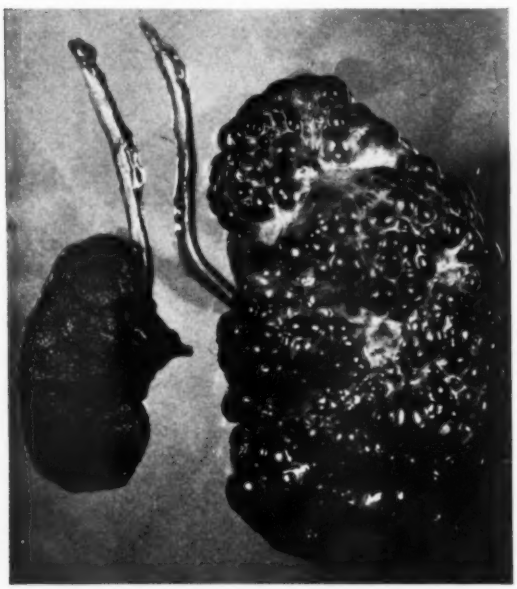

Fig. 11. Right unilateral polycystic kidney and left arteriosclerotic kidney.

Eisendrath,[16] in 1928, discussed abdominal diagnosis and the urologist. In speaking of the diagnosis of abdominal tumors, he formulated several rules which both reviews and emphasizes the importance of the anatomical relationships of the kidneys. These rules should be carefully considered before differentiating intra- and retro-peritoneal abdominal tumors:

1. "The enlargement may have its origin in a normally located and developed viscus."
2. "The location may be at a different level from that of the normal structure either as a result of ptosis or as in the case of the kidney and cæcum, failure to reach the final location, as the result of changes during embryonic life."
3. "There may, as in the case of the kidney, be marked changes both in number and form of the organ."
4. "Routine employment of utero-pyelography (and now intravenous urography) by the urologist in doubtful cases of abdominal tumor, will differentiate the kidney from adjacent organs and often differentiate various kidney enlargements."

Because it is probably the most common and expressive symptom, pain has often been called the language of disease. In renal-ureteral disease, it frequently is of little diagnostic value because it so often simulates pain due to extrarenal causes, especially those within the abdomen. Local or referred pain may be present alone or both may be noted during an attack. In our series, 64 per cent complained of pain in the renal region, while in forty per cent, the pain was referred to the genitals. Usually it requires more than a history of pain to make a correct diagnosis, but a knowledge of the characteristics of local and referred pain, in diseases of the kidney and ureter, may be of great help.

Head,[23] in 1893, pointed out that pain in an organ itself is "dull, heavy, wearing and not sharp, aching or stabbing like the referred pain." The kidney, in common with other viscera, can be cut, torn or sutured without the production of pain.[21] This is due to the fact that anatomically, the kidney and other viscera receive many efferent and very few afferent nerve fibers. Anatomically, this nerve supply is derived from the ninth, tenth, eleventh, and twelfth dorsal and the first lumbar segments.[21,36] Furthermore the capsule proper of the kidney extends over its pelvis and ureter.[6] Change in tension or muscle spasm, if sudden as in acute hydronephrosis, may cause severe pain, whereas slow distention as in tumors and polycystic kidney may produce a dull ache or no pain at all. In other words, they exhibit very little sensibility except on great and peculiar irritation.[9]

Cannon[9] has effectively demonstrated the latter point in his work on the sympathetic nervous system. He found that the sympathetics are relatively unimportant in a constant, protected environment, but emphasized their essential function in the conditions of stress and strain. Pain, fever, shock, hemorrhage and dehydration—constitute conditions of stress and strain incident to ureteral and kidney lesions. They are sufficient to cause sympathetic response. The suddenness and intensity of the stimulus will determine the character and distribution of the response.

Osler,[34] from personal experience, described two types of local pain in renal colic as follows: (1) "a constant, dull pain, the area of which

could be covered on the skin of the back in the renal region by a penny piece and which could be imitated exactly by deep pressure on a superficial bone"; (2) "flushes or rushes of hot pain at intervals, usually passing to the back—less often to the groin."

A history of increased pain on exertion is quite typical of urinary tract calculus. Harrah[20] states: "A characteristic of urinary tract stone is that the pain is made worse by exercise, especially jolting." The jarring produced by Murphy percussion over the kidney region will often elicit local tenderness in renal disease and should be used more often.

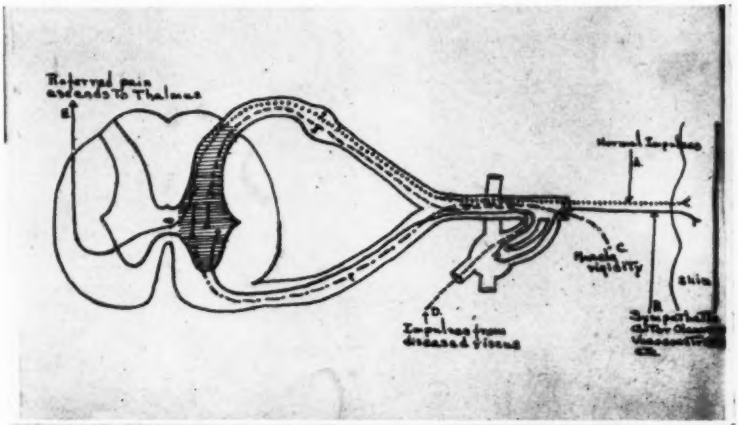

Fig. 12 *(above)*. McKenzie's theory of referred pain (outline).

Fig. 13 *(below)*. Innervation of kidney and ureter. Mechanism of referred pain beyond kidney segments. (Rassmussen.)

Everyone should try to familiarize himself with the means of differentiating backache due to other than urologic conditions. Morris[33] states that the chief conditions which are to be considered as etiologic factors in the production of backache are found in the three branches of medicine, namely, orthopedic, gynecologic and urologic. In an analysis of 3,600 cases, he states that backache of urologic origin was found in 31 per cent.

Head[23] remarked "since our viscera are so notoriously insenstive . . . . . it is not be wondered at, that the maximum pain is *not* felt in the organ affected." Howell[25] observed that "localization of pain sensations arising in internal organs is very innacurate, in contrast to the accuracy of localization of cutaneous stimuli." He further showed that the sense of touch or

pressure is much more accurate than pain in localization. Where a portion of skin has lost the sense of pressure and temperature but retained the pain sense, it was found that localization was very incomplete. It may be possible

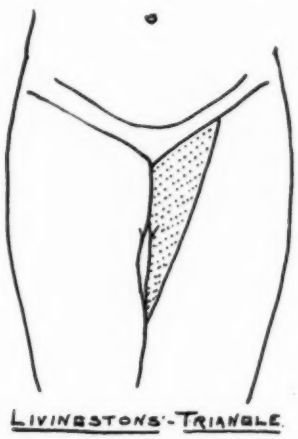

Fig. 14. Livingston's triangle.

that visceral enlargement may cause a sense of pressure, which will act as an experienced guide in the proper projection of kidney pain.

Since the kidney and ureter derive their nerve supply from the same cord segments as the liver, bile ducts, spleen, pancreas, adrenal, ovary, uterus and tubes, testes, diaphragm and appendix,[21,36] impulses starting in the kidney may be referred to any one of these organs. In the severe colics of the kidney and ureter, extreme radiation of pain beyond the ninth thoracic and the second lumbar segments, may cause deceptive symptoms in more distant organs.

McKenzie's[36] theory of referred pain is based on the synaptic overflow of nerve impulses from the autonomic fibers of a diseased viscus (ureter for example) to the adjacent segmental sensory nerve from a skin zone. This will explain (Fig. 12) referred pain to organs in the immediate segmental area of the "irritable focus" thus set up.

Rasmussen[36] (Fig. 13) explains, as stated above, that if the pain is unusually intense, there may be a spread up or down the cord, usually up. Depending upon the level of the maximum point of impingement, the brain will assume that this represents the seat of trouble. In general, the more severe the pain, the wider the spread up or down the cord. Another observation is that if abnormal irritation of a viscus is accompanied by superficial tenderness or pain, this superficial area and the irritated viscus are supplied by sensory fibers from the same segment of the cord. Also, in a given individual the point of impingement (as judged by the referred pain) will be fairly constant from seizure to seizure.[36] It is, therefore, not only possible for the intense stimulus to spread to segmental levels far distant from those of the viscus causing the pain, but also for this misreference of pain to be fairly constant in succeeding attacks.

The point of reference of pain in calculus disease may be of definite diagnostic value. According to Salmon,[38] "pain in the thigh produced by lesions of the genito-urinary tract are above the bladder, while pain in the penis, scrotum or perineum indicates involvement of the ureter adjacent to the bladder.

Livingston[27] described skin signs following acute colic in the upper urinary tract. He outlined a definite triangle, now known as "Livingston's Triangle" (Fig. 14) and bounded as follows: "a line beginning at the middle of Pouparts' ligament and running parallel to the sartorius muscle until it reaches the inner border of the thigh, forms the outer side of the triangle; the inner border of the thigh forms the inner triangular border and the inner half of Pouparts' ligament forms the third side."

Campell[7] states that isolateral cutaneous hyperesthesia over this area is best demonstrated within a period varying from five minutes to a few hours (usually not more than twenty minutes) following either experimental or clinical ureteral colic. He definitely states that "hyperesthesia confined to this triangle and maximal at its center has been found in my experience to be due to no other condition than pyelo-ureteral colic." He warns against improper interpretation of this reflex phenomenon, stating that hyperesthesia may not always fit the triangle. In mild cases it may be present only near its center, while in severe cases it may spread slightly beyond the borders.

The sign is best elicited by the application of coarse stimuli as in roughly twisting the skin between the thumb and forefinger. Besides hyperesthesia, "altered responses to heat and cold as well as localized erythema are also usually observed." It is probably due to the sudden severe

pain, caused by smooth muscle spasm of the upper urinary tract and is the somatic reflection of this internal disturbance.

Most abdominal operations are right-sided. The following case is a typical example.

Fig. 15 *(left)*. Calculus lower right ureter.
Fig. 16 *(right)*. Retrograde pyelogram showing obstruction above calculus.

Mrs. G. J. fifty-eight years old, entered St. Luke's Hospital on March 8, 1932. Four years prior, she had been operated on for disease of the gall bladder and appendix, without relief of recurrent attacks of right abdominal pain. In 1929 she was injured in an automobile accident. Since then, the attacks of pain became more frequent and severe, involving both lumbar regions. Recently the attacks were accompanied by chills and fever as well as urinary frequency.

We, of course, saw her at an opportune time and at cystoscopic examination the right ureteral catheter was obstructed 8 cm. from the orifice. On the accompanying x-ray plates (Figs. 15 and 16) a large right ureteral calculus, with accompanying hydroureter and hydronephrosis, was noted and the calculus subsequently removed surgically. Recovery was complete and no recurrence was noted.

* * *

A similar case, Mrs. T., aged forty-two, consulted us because of recurring attacks of pain over the gallbladder and appendix, although both had been removed two years previously. The pathologic diagnosis on the removed organs was chronic cholecystitis and appendicitis. Pyelograms revealed right pelvic calculus (Fig. 17), removal of which afforded complete relief.

While reflex anuria developing in cases of renal or ureteral calculus is by far the most frequent type,[22] many other causes have been cited. It may follow other urinary tract lesions or may be secondary to central or peripheral nervous stimulation.[22,41] It has been produced experimentally.[3,22,29,32] Most urologists have observed the phenomenon during or following ureteral catheterization, when secretion is often arrested for varying periods. It was formerly

Fig. 17. Calculus in upper calyx right kidney.

taught that reflex inhibition of one kidney due to blockage of its mate (contra-lateral anuria, reno-renal reflex) was the only true reflex anuria. French states "anuria may occur in patients who have undergone an operation and who are the subjects of renal disease, or may occur when no renal disease is present." Various authors[22] have noted that anuria may develop as a result of central irritation, occurring in the collapse following injury, shock, psychic inhibition, hysteria and in the late stages of severe fevers. It is, therefore, obvious that there are two types of reflex anuria. One is secondary to involvement of the urinary system itself and the other is due to extra-urinary causes.

Among Bieters'[3] conclusions, based upon his excellent experimental work on the splanchnic regulation of glomerular flow, are the following: "Section of the splanchnics, as an acute effect, results in an increase of glomeruli showing active blood flow. Various measures such as pinching the ureter, applying an irritant locally, both externally and internally, and edema fluid let into the general circulation, result in reflex arrest of glomerular flow. This reflex arrest of glomerular flow is prevented by splanchnic section and cocainization of the part stimulated. The reflex arrest produced by mercuric chloride

in the ureter and collecting ducts appears more pronounced than the reflex arrest coming from within the kidney tubules. These experiments show the marked effect of the splanchnics upon glomerular blood flow and, as far as they are

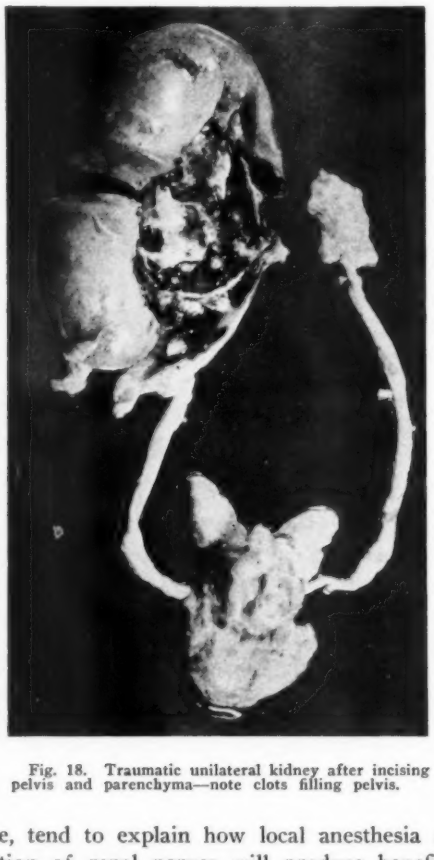

Fig. 18. Traumatic unilateral kidney after incising pelvis and parenchyma—note clots filling pelvis.

able, tend to explain how local anesthesia and section of renal nerves will produce beneficial results clinically in reflex oliguria and anuria."

It is quite generally agreed that whatever the exciting cause, stimulation of the splanchnic fibbers to the kidney, producing vasoconstriction, is the cause of the renal anemia and consequent anuria. Granting this to be true, its stimulation should produce oliguria while exclusion of it by known methods should increase urinary secretion. Several investigators[3] have shown that in kidneys that have not suffered extensive structural degeneration, diuresis has followed sectioning of the splanchnic nerves, after renal periarterial sympathectomy,[32] after paravertebral block with a local anesthetic[22] and following renal decapsulation. Relief from the latter procedure is now explained on the basis of its breaking the reflex nerve tension rather than from releasing capsular tension.

Since the condition is functional rather than organic, it is presumed to have existed in: (1) all those cases in which death occurred and the autopsy showed rather normal kidney and ureters; (2) in those in which function was restored without any residual injury to the organ.[41] I have observed two cases recently which illustrate some of the problems in the diagnosis of reflex anuria.

The very obscurity of an anomaly may allow the patient to go on with indefinite complaints until a sudden, severe attack brings him in to the hospital, too sick to be thoroughly studied. Oliguria and the preuremic symptoms may then confuse the picture, as in the following case.

Mr. E. M., aged thirty-four, was hit by a plow handle in the left kidney region, one week before his admittance to St. Luke's Hospital on June 12, 1934. Following his injury he developed moderate pain in the *left* flank which radiated to the *left* scrotum. He attempted to continue work, but was soon so sick that it was necessary to consult his local doctor. His complaints of shortness of breath, general weakness, nausea and abdominal distention increased hourly until it was deemed advisable to transport him from his home to Duluth, a distance of sixty miles.

Upon his arrival, examination showed him to be critically ill. He was somewhat cyanotic, breathing was labored, pulse was rapid and a blood pressure of 180/110 was noted. At this time, his pain had shifted to the *right* kidney region. A small amount of blood was obtained by catheter on entrance to the hospital. There was complete suppression of urine during the following thirty-six hours. Mounting blood nitrogen readings, as well as general symptoms, pointed to an impending uremia.

On the basis of right sided pain, diathermy stimulation over this area was tried, without response. A consultant at this point suggested right renal decapsulation, but this was not attempted. General supportive treatment as well as the usual methods to promote elimination through the skin, bowel and kidneys, were unsuccessful. The patient died three days after admittance, in uremic coma.

Autopsy revealed (Fig. 18) a congenital absence of the right kidney, with compensatory hypertrophy of the left. The pelvis was partially filled with clotted blood and there was parenchymal hemorrhage over a small area. Moderate hydronephrosis was noted. The capsule was intact.

Rupture of one kidney is not usually as serious as rupture of the liver or spleen. They are normally retroperitoneal and bilateral and the

CHART II.

Date	Jan. 30	Jan. 31	Feb. 1	Feb. 2	Feb. 3	Feb. 4	Feb. 5	Feb. 6	Feb. 7	Feb. 8	Feb. 9
Urea N.	Injured 11 P. M.			35.9		63	98	105	112.9	115	Uremic death
Creatinin				3.8		5.—	6.—	6	7.5	8.5	
Output		900 c.c.	300 c.c.	20 c.c.	70 c.c.	185 c.c.	191 c.c.	150 c.c.	59 c.c.	?	
Fluid intake		2500 c.c.	2900 c.c.	2365 c.c.	3890 c.c.	3200 c.c.	?	?	?	?	
Urine albumin		+	+	Trace		+++				++++	

uninvolved kidney usually compensates. According to McKenna,[31], the diagnosis of extravasation and the extent of injury are enhanced by intravenous urography. In unilateral kidney, trauma is of course more serious.

Kidney trauma may be accompanied by anuria but this is usually confined to the injured kidney. In our case, the history of injury and pain was left-sided but the pain had shifted to the *right* lumbar region on our first examination. We reasoned that he had bilateral renal injury or reflex anuria but were unable to verify the diagnosis due to the poor general condition of the patient. Autopsy did not prove whether the unilateral kidney stopped secreting because of obstructive blood clots or because of a reflex nervous reaction. It is probable that both played a part in the production of the predominant general symptoms of uremia.

The second case is that of a male physician, thirty-four years old. On January 30, 1936, at about 11 p. m., he fell and struck the back of his head, causing a transverse laceration in the suboccipital region about two inches long. This laceration extended through the thickness of the scalp and there was considerable bleeding from it. It was closed with sutures and he was put to bed with an ice cap.

Several hours later his wife, a graduate nurse, noted that he could not be aroused and that he was pulseless. He was sent to the hospital and on his arrival, he was in a state of extreme shock with a blood pressure of 60/0. He was pulseless and in coma. This was on the morning of January 31. He was given the usual treatment for shock. Spinal puncture showed clear fluid with moderately increased pressure. Within three days he recovered from shock and became quite clear mentally. At this time urinary suppression became evident. From this point on the treatment was based upon the renal insufficiency, illustrated in the following chart (Chart II).

The temperature during this time varied from 99.8° to 102°. The white blood count from 9,300 on admittance to 17,200, three days later. Hemoglobin was quite normal, and the blood pressure rose from 60/0 on admission to 170/86 five days later. The clinical diagnosis of the various attending men varied between toxic nephrosis and reflex anuria. Urinalysis for heavier metals was negative, and there was no diarrhea except on stimulation.

The operative findings at the time of decapsulation showed a somewhat enlarged right kidney, but on slitting the capsule it did *not* retract as though under tension. On the other hand, after sectioning the capsule, the cortex was incised slightly in the process of decapsulation. The kidney substance was *gray* in color and the incised area did *not* bleed, although all the surrounding tissues bled freely during operation and the patient's blood pressure was 146/90.

Postmortem findings on March 6, 1936, were, therefore, quite interesting even though performed on an embalmed body, partly frozen and with some postmortem changes grossily evident. Aside from the transverse suboccipital healed scalp wound, examination of the skull and cranial contents was negative. Besides, all vital organs including the heart, lungs, liver, spleen, stomach and intestines were quite normal aside from the edema accompanying the uremia.

The renal vascular supply, ureters and kidneys themselves were subjected to thorough search for gross and microscopic evidence of disease, in view of the uremic death. Dr. E. T. Bell described the kidneys, ureter and bladder as follows: "The right kidney has been decapulated. There is no hemorrhage about this kidney; it is large, measuring 12.5x7x4.5 m.; the left kidney measures 11.5x7.5x5 cm. The kidneys are in normal position; the right weighs 210 gms., the left 205 gms. No hemorrhages about either kidney. Both renal arteries and veins are normal on careful examination. The pelves of both kidneys are entirely normal, showing no distention whatever; the ureters are normal. The bladder shows a clear mucous membrane with no evidence of disease. The prostate is small.

Microscopic Examination.—Kidneys: fairly normal glomeruli; tubules show no necrosis but for the most part are greatly dilated.

Diagnosis.—Renal insufficiency of undetermined origin.

Dr. Arthur H. Wells of St. Luke's Hospital in an analysis of tissues from the various vital organs found them quite normal except for congestion of lungs and spleen. He described the kidneys microscopically as follows: "The glomeruli in places show a mild congestion, but no inflammatory cell reaction of significance. They are not sclerosed. The tubules in two of

the sections are irregularly dilated and this dilatation involves varied portions of the tubules. Generally the tubules near the surface are not dilated but compressed. The epithelial lining of the tubules is fairly well stained and there is only a small amount of finely granular debris in the lumen. There is no necrosis of tubular cells, no active regeneration and very little swelling. The cells are flattened in the dilated tubules. One section shows no such dilatation whatever and the other two are apparently artifacts resulting from embalming. Both large and small blood vessels are not sclerotic."

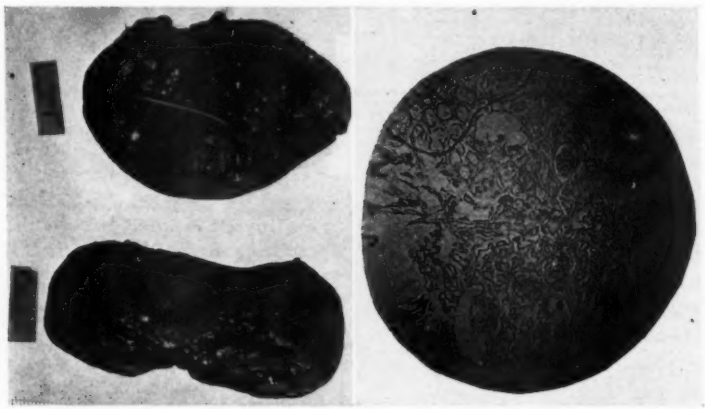

Fig. 19 *(left)*. Longitudinal section. Reflex oliguria.
Fig. 20 *(right)*. Microscopic section left kidney showing dilated and compressed tubules but no other structural changes.

His microscopic diagnosis was (1) pulmonary congestion (2) splenic congestion (3) post mortem artifacts in kidney and brain. (Figs. 19 and 20.)

It is, therefore, evident that the general anasarca present, as well as the mild cloudy swelling in the kidneys themselves, could well account for both the albuminuria and the moderate enlargement. In my opinion, the absence of urinary evidence of the heavier metals, the patient's absolute denial of taking anything to terminate his life, the lack of ulcerations in the intestines and finally the absence of any change in the tubules or glomeruli, precluded the diagnosis of anything but reflex anuria incident to head injury and delayed shock in this case.

The two cases reviewed above illustrate the many diagnostic problems presented in cases of reflex renal-vascular constriction due to stimulation of the splanchnics. In many instances, the diagnosis can be made only by exclusion of organic causes in the urinary organs. It is my opinion that only the smaller arteries and especially the arterioles are constricted. Even though prerenal and intrarenal vascular constriction has been described as causing differing intravenous urograms,[44] I am unable to conceive of sufficient nervous stimulation to cause complete occlusion of arteries which are really larger than the size of the organ warrants. In the first case the exciting cause (kidney trauma) involved a unilateral kidney. In the second, it was due to trauma of central origin—thus illustrating the two reflex types—one involving the urinary system and the other due to extraurinary causes.

Uncertainty regarding the presence of renal-ureteral disease, therefore, may often be due to divergent nervous manifestations. One should bear in mind the nature of direct pain in the organ. Careful observation of its intensity, type and point of reference may be of definite diagnostic value.

The key symptoms of urinary disease are pain, hematuria and pyuria. The precision which marks urologic study is derived from proper cystoscopic, x-ray and laboratory interpretation. Confusion may result from the absence of many or all of the cardinal symptoms or from the deceptive nature of the so-called exact corroborative evidence.

Hepler[24] states that hydronephrosis may, in the absence of infection, develop to a great extent without producing symptoms. He notes that this is particularly true of *congenital* lesions producing slow obstruction and not causing symptoms until puberty. He has observed that silent hydronephrosis is nearly always left-sided. Right-sided lesions more often involve the duodenum and common bile duct. They, therefore, produce gastro-intestinal symptoms earlier.

Approximately 10 per cent of renal and ureteral calculi do not cast x-ray shadows and in some instances, their presence or passing is symptomless.

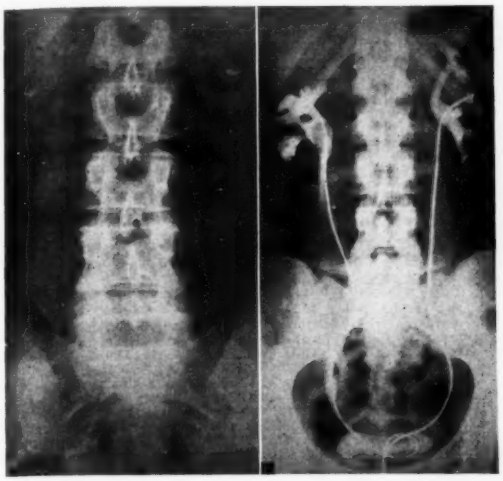

Fig. 21 *(left)*. Negative plate pre-operatively to show renal or ureteral calculus.

Fig. 22 *(right)*. Same with retrograde filling showing rather large pelvic calculus.

A case in mind is Mrs. R., thirty years old, whom I saw in consultation because of nausea, vomiting, low-grade fever and dull pain in the right lower abdomen. Three urinalyses yielded conflicting reports, one showing several red cells microscopically. A flat x-ray plate was taken and reported negative (Fig. 21).

We considered the possibility of shadowless stones (cystine, xanthine, soft stones of albumin, fibrin and blood). However, on the basis of the clinical findings and a white count of 12,000, we made a diagnosis of acute appendicitis.

At operation the appendix was quite normal in appearance. A long search of the right kidney and pelvis elicited no stones. No operating x-ray unit being present, the abdomen was closed, although we suspected we had missed a calculus. Subsequent recurrence of symptoms and retrograde pyelograms (Fig. 22) revealed a calculus in the right renal pelvis which was removed without difficulty.

Interesting in this case was the presence of one negative and one positive x-ray plate on the same stone. Since the chemical composition of the calculus was found to be the type to cast an x-ray shadow, it was assumed that the technic was faulty. The failure to palpate with gloved fingers a renal pelvic or ureteral stone is not surprising. It is sometimes impossible, without an x-ray at operation, to localize the calculus, even when one is certain of its presence.

Hematuria in the upper urinary tract is most often due to ureteral calculi. According to Doss,[15] inflammation, neoplasm and foreign body comprise 79 per cent of the causes of hematuria. On the other hand, as a *sign* it is most frequently noted in cases of trauma, tuberculosis and neoplasm. He states that in women inflammatory conditions and calculi of the urinary tract are the commonest causes. However, calculi may produce no bleeding, other symptoms directing attention to them.

Fig. 23. Right hypertrophic and left atrophic kidneys (ulcerations in bladder at one time).

Symptoms of renal tuberculosis are sometimes silent but are more often obscured by existing vesical irritability. Caulk[11] observes that a simple cystitis usually subsides under ordinary medicinal treatment within ten days. If it continues longer, one should look for other organic disease. Of the ten patients suffering from tuberculous kidney in our series, six complained of frequency and five of dysuria.

One patient who had been treated four weeks prior to operation for simple cystitis, illustrates the dictum that "cystitis alone is seldom a primary disease." The usual typical ulcerations about the ureteral orifice were present.

Bladder ulcerations in this location causing pyuria, frequency and dysuria are not always tuberculous.

Mrs. B., aged fifty-seven, was cystoscoped in 1914 by a competent urologist. He reported "ulcerations of the bladder, particularly on the right side; unable to catheterize right ureter." There was a large amount of pus in the urine.

In 1915 she was cystoscoped elsewhere and told that the left kidney was "dried up." In 1928, she gave a history similar to one we obtained in 1933, namely, that she had two diagnoses made thirteen years previously of tuberculous kidney. Aside from confusion arising from the findings of adenomatous goiter, aortic stenosis and cardiovascular lues, post mortem findings in 1935 were of interest because of the condition of the kidneys (Fig. 23).

You will observe that the left kidney showed marked hypoplasia and atrophy, weighing only ten grams. The right was hypertrophic, weighing 425 grams. There were several scattered non-specific abscesses in the cortex and medulla, evidently a terminal pyelonephritis. No evidence of tuberculosis was noted.

Superimposed biliary tract shadows over the right kidney may be confusing.

A male, G. A., aged sixty, was examined on March 2, 1926, because of repeated attacks of pain over the gallbladder region. Urinalysis was negative, but x-ray plates showed definite stone shadows interpreted as being in the gallbladder.

To my regret, this patient was later operated elsewhere and a right renal calculus removed. The attending surgeon told him at the time that exploration of the gallbladder revealed no stones. However, on his return to this city one year later, he died following an attack of acute abdominal pain, similar to one which I had previously observed. Post morten showed an acute cholecystitis, cholelithiasis, accompanied by acute pancreatitis.

The presence of shadows suggestive of renal-ureteral calculi, may be due "to foreign bodies in the gastro-intestinal tract, biliary calculi, fecaliths, retroperitoneal and mesenteric enteroliths, calcified venous aneurism, calcified glands, tuberculous lymph nodes and broncholiths." They may be due to defects in the x-ray film. Calcified areas within the kidney itself may be confusing. The problem of correlating the x-ray picture with the clinical findings may offer considerable difficulty. In any case, a good rule to follow is "when in doubt, study the case further."

Summary

1. The deceptive nature of renal ureteral disease has an historical background which emphasizes its importance.

2. A review of eighty St. Luke's Hospital cases reveals that most of them exhibited one or more positive findings referable to the urinary tract.

3. Confusion in diagnosis is usually due to other factors. It may be the result of the predominance of general symptoms, anatomical abnormalities and disturbances in adjacent organs, extrarenal and ureteral nervous manifestations or absence or obscurity of many or all of the key findings in urinary tract disease. It is well to remember the axiom "The seaman cannot always avoid the storms but that is no reason for not watching the barometer."

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REFRACTION OF CHILDREN*

ELMER O. DAHL, M.D.

Minneapolis

I BELIEVE that every child upon attaining school age should be refracted under a cycloplegic. It should be done regardless of whether the child manifests the slightest abnormality, either local or remote. This, to many of you, sounds radical, and to some ridiculous. Many years of association with the Minneapolis School Board has convinced me that it is a sound procedure. It is not my purpose to burden you with a detailed account of the usual symptoms of eye strain, but, it is necessary for me to outline my reasons for the conclusion.

The ideal time for the refraction of children is just before they begin school. Of course, some should be refracted at an earlier age, notably those with strabismus. It is a most common experience to ask a mother of a child with strabismus why nothing has been done about the child's eyes before, and to have her reply that the family physician has said that the child would probably outgrow it. Certainly a physician who gives a mother such instructions does the child a grievous wrong. The treatment of strabismus should begin as soon as it appears. Incidentally, we encountered two children with convergent strabismus who were found to have choked discs and were sent to neurologists. An early diagnosis of brain tumor was made in each case.

As to the choice of cycloplegic, there is some variance of opinion. In a series of fifty young children chosen in sequence, the refraction was done first with homatropine and then with atropine. The homatropine was found to be slightly less efficient than atropine, but its action has the great advantage in that it disappears so rapidly. We use homatropine as routine in the refraction of children. Whenever a more complete paralysis is desired, such as in cases of convergent strabismus, atropine is the choice.

Routine fundus examination reveals lesions of the eye which would be a serious handicap to a child beginning school life. Many of these may not affect central vision, and therefore, do not prevent 20/20 vision. Here may be mentioned syphilitic and tuberculous retinitis and also the albuminuric and diabetic forms. Occasionally, we see a pigmentary degeneration of the retina and an optic atrophy.

Thorington[5] states that in infancy we are nearly all hyperopic. This hyperopia, he says, gradually decreases until at adolescence a state of emetropia is arrived at. Tenner,[4] in New York, found 91 per cent of the children at five hypermetropic in a series of 4,800 cases. He found that only 48 per cent remained hyperopic at the age of sixteen. Other authors consider hyperopia permanent. I do not know what the usual refractive error of infants is, but, I have had the opportunity of observing ten thousand children in our series from the ages of five or six years until adolescence, and, I have not seen this gradual lessening of the amount of a major hyperopia in more than a few cases. Practically speaking, we do know that the amount of hyperopia does not increase, nor, does the amount of

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myopia decrease to any appreciable degree. Therefore, if we refract a child under cycloplegic once and find him without hyperopia, it should not be necessary to refract him again so long as his vision remains normal. The only error that will develop is myopia and that will be revealed by defective vision.

In an analysis of 2,500 cases, Clark[3] has found the following:

Same refraction in both eyes	657
Emmetropia	9
Hypermetropia	63
Myopia	22
Astigmatism	563
Anisometropia	1,843

This analysis shows the very striking preponderance of astigmatism. Duke-Elder[2] states that the correction of very small errors frequently result in unexpected and dramatic relief. To emphasize this I wish to cite a case. It is the story of a girl whose infancy and early childhood was marred by frequent convulsions. Any slight cold or dietary indiscretion would bring them on. The child was weak and puny. Pediatricians and neurologists were unable to benefit her. Finally she started school, and her progress was poor. An alert school nurse in checking her vision reported that while she obtained 20/20 vision it was only with great effort. The nurse recommended to the mother that an oculist be consulted. After some delay this was done. A moderate degree of hyperopia with some astigmatism was found and corrected. The change was miraculous. In six months this little girl became a fat, robust, and happy child. Her school work has been brilliant.

Let us consider the child myope. Here the vision is always defective and refraction improves or brings the vision up to normal. Most authors agree that the best treatment is a full correction, avoiding unnecessary reading, encouraging outdoor sports, and promoting general health. Myopia in a child must be considered potentially progressive, and vision should be checked at least every six months. There is a hereditary tendency, and Harmon[1] found this to be 9 per cent. Many theories are given as to the predisposing and underlying etiology. It is a developmental defect. It has been my good fortune to observe two sets of identical twins with progressive myopia. I will describe my findings in one set. On entering school the vision was normal. At seven years, a myopia of 1.5 diopters was noted and corrected. The amount of myopia was very nearly the same in both twins. For eighteen months they remained stationary, and then they progressed another diopter of myopia followed by another stationary period. The other set of twins under my observation had a similar course. This identical development of myopia in identical twins makes me suspicious that our treatment is of little value in so far as the progression is concerned. I have been unable to find any reference to similar findings in literature.

At present there is a wave of popularity for orthoptic training. Whether the many claims for it can be substantiated I do not know. Certain it is that some of these children with suppression can easily be stimulated to binocular vision and the avoidance of amblyopia exanopsia.

We have in our school system a child guidance clinic for delinquent and incorrigible children. These children are carefully studied and reasons sought for the delinquency. More and more these children are recommended for refraction, and many brilliant results are obtained when refractive errors are corrected. Then there are children who do not quite get into the delinquent class but who are ill natured and a care to their mothers. Often these with properly fitted glasses become happy and lovable children.

Still another class are the subnormals. These children are grouped together in our schools so that they will not be a drag on the progress of normal children. I do not claim that a pair of glasses will give them brains, but we do find that when glasses are needed it often helps them enough so that they are able to join in the class work of normal children.

Children whose vision cannot be brought up to certain standards or suffer from asthenopia due to high refractive errors, should be segregated and given special consideration.

Before a child enters school, the loving mother takes him to the pediatrician and has him immunized to diphtheria and smallpox. His teeth and tonsils, heart and lungs, are carefully checked. She buys him a new suit of clothes and proudly sends him on his way. Who can tell but what a load of hyperopia or astigmatism may be sapping his vitality?

The importance of the relief of eye strain in the health and happiness of children is not emphasized sufficiently. The mention of it in a

majority of books on general medicine is rare and casual. Too often, the ocular cause of the trouble is neglected or thought of as a last expedient when it should have been considered first. One reason for this is that eye strain may not be suspected from the symptoms for many of them bear little or no relation to ocular origin. The eye is our dominant sense organ and in our complex civilization it is subjected more and more to stresses and strains. It seems reasonable that every child should be given a painstaking refraction before beginning school life.

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BUMPER FRACTURES OF THE TIBIA

ORWOOD J. CAMPBELL, M.D.

Minneapolis

AMONG the more serious fractures of the lower extremity are those produced by the bumper of an automobile. So characteristic are the types of injuries produced and so definitely related to the use of the automobile that Cubbins[1] and his associates in 1929 termed them "bumper fractures." In the same year Cotton[4] and Berg named them "fender fractures." These authors refer to fractures at the knee in which the lateral condyle is broken by a medial buckling of the joint due to the sudden application of force on the lateral aspect. In the forced valgus position the internal lateral ligament, though injured, holds and the stronger lateral condyle of the femur is forced against the lateral condyle of the tibia, producing a fracture with various degrees of depression and spreading.

As originally applied to such a fracture, it was not known which term was the more accurate in describing the etiological relationship of the car parts, but "bumper fractures" has been more generally accepted.

Since 1929 automobiles have been built with lower centers of gravity and with lower bumpers. The injuries produced by these cars involve predominantly the shafts of the tibia and are characterized by severe comminution with many larger and smaller fragments, linear fracture lines into the shafts and in the center a diamond or pyramid-shaped piece of cortex. There is usually an associated fracture of the fibula, extensive injury to soft parts, and frequently compounding.

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It is unfortunate that these two types, knee and shaft, should be included under the same descriptive term, since the term thereby requires some qualification before it can present a clear picture of a fracture entity.

However, the current low bumpers could not reasonably produce fractures confined to the knee joint, and the characteristically comminuted fractures of the shaft which are produced more truly deserve the name "bumper fractures."

Fractures of the lateral condyle of automobile origin are still being seen, though probably less frequently. Their persistence after the old high bumper is almost entirely absent from the street suggests that Cotton's term of "fender fractures" is the more accurate and should be used to designate the knee type of injury.

The problem of maintaining reduction in the badly comminuted and frequently compounded fractures of the tibial shaft and the problem of restoring the injured knee joint to a condition approximating the normal, continues to concern the conscientious surgeon.

Bumper Fractures at the Minneapolis General Hospital

In reviewing the experience of the fracture service at the Minneapolis General Hospital, it is convenient to present the material first as a whole and then to consider the two types separately.

In the five-year period from 1931 to 1935 inclusive, there were 4,227 patients admitted to the hospital with fractures produced by automobiles.

TABLE I.

Incidence

Total patients admitted with fractures caused by automobiles 4,227
Total patients admitted with bumper fractures 148
Percentage of bumper fractures 3.5%

Types

Fractured Condyles—52 Cases

Lateral condyle alone affected in 46 cases.
Mechanism—Medial buckling of the knee joint caused by force applied to the lateral aspect.

Fractured Shafts—96 Cases

Associated fracture of the fibula—90% of cases.
Comminution in 95% of cases.
Compounding in 42% of cases.
Mechanism—Shattering by direct force.

TABLE II

Age Incidence

90 cases (60%) were 40 or more years of age.
71 cases (48%) were 50 or more years of age.

Sex Incidence

Males—122. Females—26.
Ratio—5 to 1.

Level of the Fracture Sites (Shafts)

Percentage	1931	1932	1933	1934	1935
In Upper ⅓ of Shaft	65%	75%	47%	50%	45%
In Middle and Lower ⅓ of Shaft	35%	25%	53%	50%	55%

Of this number, 148 were bumper fractures of one or the other type, an incidence of 3.5 per cent. Fifty-two patients had received fractures of the lateral condyle and ninety-six patients fractures of the shaft of the tibia.

Ninety of the 146 patients (60 per cent) were over forty years of age and seventy-one (48 per cent) were over fifty. The age incidence is in accord with the known fact that in most pedestrian accidents the victims are in their later years.

Males predominated over females in the ratio of 5 to 1.

Bumper Fractures of the Shaft

Of the ninety-six patients with fractures of the shaft of the tibia, 90 per cent had associated fractures of the fibula usually at the same level but occasionally at different levels. In 95 per cent of cases, the bones were comminuted and in 42 per cent the injury was compound.

Table II indicates the increasing tendency of these injuries to occur lower in the leg, a tendency to which Stern and Papurt,[18] and Griswold[13] have already called attention and have attributed to the lower bumpers.

Treatment of Bumper Fractures of the Shaft

The treatment of bumper fractures of the shaft does not differ from the treatment of fractures produced by other mechanisms. The extensive comminution, the frequency of compounded injuries, and the long healing period impose technical difficulties which are not encountered in less severe fractures. Early treatment by traction, reduction, and immobilization with correct alignment of shafts are principles recognized since Hippocrates' writings. Anesthesia and proper attention to the preservation of function are likewise principles of long standing. All variations and advancements in technic have earned their acceptance by better accomplishment of the above mentioned principles. The simplest and safest means which can accomplish the desired result are always to be favored but, because of a mistaken idea of conservatism, the patients should not be deprived of a favorable functional result by failure to utilize methods that involve the use of skeletal traction or open reduction.

Of the ninety-six patients in this series of bumper fractures of the tibia, fifty-six were simple and forty compounded. Of the fifty-six simple fractures, twenty-four (40 per cent) were treated by manipulation and the application of plaster casts. These cases naturally include the less seriously comminuted injuries. Loss of position within the cast happens so frequently that it is considered safer in all except the most favorable cases to initiate treatment with skeletal traction. It is noted that in later years fewer

Fig. 1. C. E., aged fifty-eight. Comminuted and depressed lateral condyle not improved by manipulation. Functional result—80° flexion, marked lateral instability. Permanent disability rating by Industrial Commission 25 per cent.

cases were treated by the application of casts until bony union which was secured under skeletal traction was well started.

It has been found better to utilize skeletal traction to maintain position rather than to secure reduction. Accordingly, the fracture site is anesthetized, a Steinman pin or Kirchner wire is passed through the os calcis, and immediate reduction by traction and manipulation is made. When the most favorable position has been secured, a moulded plaster splint is applied from knee to toes and after the plaster has hardened the extremity is laid in a Braun Boehler splint with 10 to 15 pounds traction. In from three to eight weeks, depending upon the progress of healing, traction is removed and a circular cast applied. No particular attention is paid to the fractured fibula. When the tibia is reduced, the fibula cares for itself and always unites. The position obtained in the union has no relationship to the end-result.

The use of traction and counter-traction by the two-pin method, as described by Boehler[1] and others and advocated by Senger[16] and Norman, Griswold, and others, is finding favor. Several good apparatuses are on the market. Pins passed through the proximal and distal ends of the tibia give good control over the fragments and, what is more important, when incorporated into the cast prevent slipping and obviate the need of repeated manipulations. As indicated by Stern and Papurt, repeated manipulations break down the connective tissue and capillary framework upon which bone is laid down and exhaust the regenerative process. Among the causes of non-union Cubbins[9] and associates list

Fig. 2. A. R., aged thirty-four. Typical bumper fracture without wide displacement. Skeletal traction through os calcis six weeks. Full weight bearing in eight months. Functional result good.

repeated manipulations and meddlesome testing for motion in the healing fracture.

There is the additional advantage of shortening the period of hospitalization. Griswold reports an average of eight and one-half days' hospitalization for bumper fractures so treated.

Fig. 3. A. S., aged twenty-eight. Bilateral compounded bumper fractures. Right leg severely compounded. Kirschner wire traction to os calcis. Suspension in Braun Boehler splint. Left leg moderately compounded. Reduction in MacMillan apparatus with two pin fixation in plaster.

Only a few of the later fractures in the above series have been handled in this way but the method will probably supplant skeletal traction except for the most severely compounded cases and those in which infection has already started.

Compound fractures received early, before infection had occurred, were treated by careful debridement, cleansing of the skin and wound, and primary suture. Thereafter, the fracture was handled like a closed fracture. Ten (25 per cent) of the forty cases were placed immediately in casts while thirty (75 per cent) were treated by skeletal traction on a Braun Boehler splint. Only one amputation was done for infection and there were no deaths from sepsis.

Healing Period

The long healing period of these bumper fractures of the shafts as noted by Stern and Papurt and others can be attributed to the extensive comminution in which a large amount of new bone must become quite solid, to infection associated with compound fracture, and to the poor blood supply of the middle and lower third of

TABLE III. TIME REQUIRED FOR FIRM BONY UNION AND UNSUPPORTED WEIGHT BEARING
48 Cases Averaged 25.5 weeks or 6 plus months

Type	Upper ⅓ of Shaft	Middle and Lower ⅓	Total
Simple	10 cases av. 21.2 weeks	18 cases av. 24.9 weeks	28 cases av. 23.5 weeks
Compound	10 cases av. 23.9 weeks	10 cases av. 32.4 weeks	20 cases av. 28.5 weeks
Total	20 cases av. 22.5 weeks	28 cases av. 27.6 weeks	48 cases av. 25.5 weeks

Fractures in the middle and lower third on the average required five weeks longer for healing than those in the upper third.

Compound fractures on the average required five weeks longer for healing than did simple fractures.

Fig. 4. Illustrating the position secured by the two-pin method as shown in Figure 3.

the tibia. Non-union and delayed union occur more frequently in the lower third of the tibia than in any site in the body excepting the neck of the femur. The two cases of non-union and two cases of delayed union in this series were all fractures in the middle or below the middle of the leg.

Based upon forty-eight fractures of the tibia in which accurate follow-up information was available, the average period required to accomplish firm bony union which would permit unsupported weight-bearing was 25.5 weeks, or six months. Fractures in the middle and lower thirds required on an average five weeks longer for healing than did fractures in the upper third. Compound fractures required on an average five weeks longer for healing than did simple fractures.

It has been the practice to permit weight-bearing in the cast as soon as callus is well established. Under the stimulus of weight-bearing, sluggish callus will sometimes go on quickly to firm union and, even though motion in the joints is not permitted, the muscular exercise limits atrophy and makes rehabilitation of the limb more easily accomplished when the cast is removed. Boehler, Stern and Papurt, and others direct attention to the danger of instituting massage and motion at the expense of an adequate period of immobilization.

Fig. 5. Appearance of the finished cast in a patient in whom the two-pin method was used. The ends of the pins are shown, covered.

Results

There were five deaths in the entire series of 148 cases, a mortality rate of 3.4 per cent. Four of the five deaths occurred in the series of ninety-six fractured shafts. The causes of death are given in Table IV. Cases with multiple injuries resulting in death of the patient within

TABLE IV

Results

Deaths	Cause
2 Simple Fractures	Pneumonia
3 Compound Fractures	Shock Peritonitis Pneumonia

Total 5 of 148—Mortality rate 3.4%

Amputation	Cause
1	Infection
1	Damaged circulation

Total 2 of 148

Fractures of the Shaft

Type	Cases	Anatomical Results			Cases	Functional Results		
		Good	Fair	Poor		Good	Fair	Poor
Simple	37	35	1	1	23	20	2	1
Compound	30	24	4	2	18	15	2	1
Total	67	59	5	3	41	35	4	2

Anatomic Results

Good	Fair	Poor
88%	7.5%	4.5%

Functional Results

Good	Fair	Poor
85%	10%	5%

Non-union 2 cases—Delayed union 2 cases

twenty-four hours were not included in the series.

The anatomic position was noted in sixty-seven of the ninety-six patients. When the end-result showed an offset of not more than half the diameter of the shaft and when the alignment of the shaft was good, the result was rated "good." Eighty-eight per cent were so recorded.

Results were recorded as "fair" when the offset was more than half the diameter of the shaft but when the alignment remained good and no serious shortening occurred. Seven and one-half per cent were so rated.

"Poor" anatomic results were recorded when there was angulation in the fracture causing malalignment or when serious shortening occurred. There were 4.5 per cent so rated.

The functional results could be ascertained in only forty-one patients, of which 85 per cent were recorded as "good," i.e., without pain, shortening, or handicapping loss of motion in contiguous joints. In 10 per cent "fair" results were noted where the patient was to some degree handicapped by pain, stiffness of joints, or shortening. In 5 per cent the end-results constituted a serious handicap to the patient and were rated "poor."

Fender Fractures of the Knee Joint

Of the 148 fractures, fifty-two involved fractures of the lateral condyle, or of the lateral condyle plus the tibial spine, or plus the medial condyle. The lateral condyle alone was involved in forty-six cases.

It is interesting to note that whereas in fractures of the shaft there was no preponderance of one side over the other, in fractures of the lateral condyle there were twice as many injuries on the left as on the right side. This, in conjunction with the notation of a higher percentage of associated injuries in fractures of the shaft, supports the conjecture that patients receiving fractures of the lateral condyle for the most part received glancing blows as they entered the traffic lane nearest the curb, and that the portion of the car causing the damage was the fender or wheel rather than the bumper.

Twelve of the fifty-two cases were mild injuries, six of which required no reduction and were not immobilized. The balance fell into three main groups: (a) those in which the lateral condyle was displaced laterally but not depressed; (b) those in which the condyle was depressed as a whole with little or no comminution; and (c) those in which varying degrees of

Fig. 6. Progress of bony union in fracture previously illu trated in Figure 2.

Fig. 7. F. J., aged nineteen. Badly comminuted compound fracture. Fragments maintained in good alignment. Full weight bearing in nine months. Functional result good.

depression and comminution were present. Unfortunately, the latter type predominated. Associated fracture of the head of the fibula was present in most cases. Care in the interpretation of x-rays is needed. The ordinary anteroposterior and lateral films often failed to show depressions limited to the anterior or posterior part of the condyle.

Treatment

A variety of treatments were recorded. In thirty-one patients, manual manipulation alone was used. The knee was forced into a varus or bow-legged position to place the intact lateral ligament under tension and to pull the displaced tuberosity upward into proper alignment. Lateral spread was counteracted by pressure on the condyle and a plaster cast applied for six weeks.

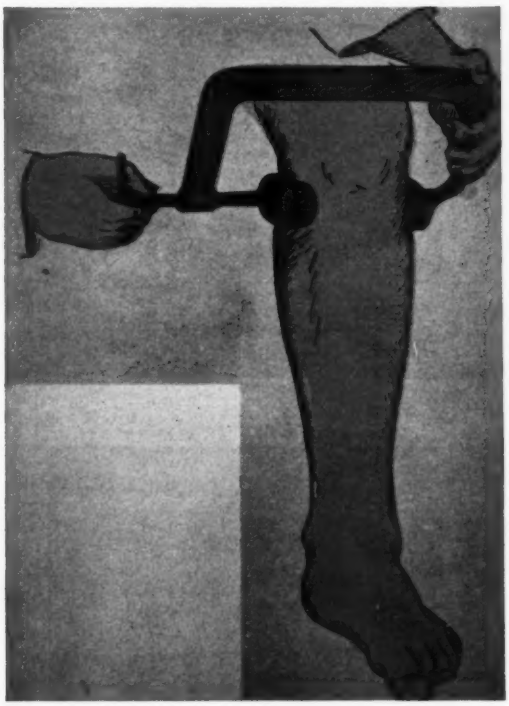

Fig. 8. Forrester's modification of the carpenter's clamp as applied to the condyles.

Traction on the leg which permitted some motion in the knee was used in four cases, manipulation plus the use of the mallet in four cases, and manipulation plus the use of the carpenter's clamp in three cases. Two open operations were done on comminuted depressed condyles which could not be raised by other means, but the operations were undertaken too early, no sizable fragments were found with which to work, and little was accomplished. The method used in two cases was not recorded.

Results

A satisfactory analysis of results obtained cannot be given. Function must be rated not only with regard to the preservation of motion but also to the maintenance of stability. Lateral instability is rated by the Minnesota Industrial Commission at from 10 to 30 per cent of the use of the knee. A knee ankylosed in a favorable position is often preferable to a highly unstable one. It was disappointing to find that accurate observations in both respects were so few. Furthermore, the recorded observations were frequently made before a reasonable healing period had passed. In some patients, motion and stability improves up to eighteen and twenty-four months. In others, irregularities of the joint surface, the presence of loose bodies in the joint, torn semilunar cartilages, or the persistence of a valgus deformity with a consequent strain on the ligaments produce an arthritis which progressively decreases the usefulness of the joint.

In general, it may be stated that functional results paralleled anatomic results. Fracture of the condyle with displacement as a whole and without severe comminution were reduced satisfactorily and the functional results seemed to be for the most part good. Depressed and comminuted condyles were very little influenced by any of the means utilized. Occasionally good functional results were obtained in the presence of considerable unreduced deformity but in general the results in these fractures were not satisfactory.

The Experience of Others

It is useful to look into the experience which others have had with bumper or fender fractures of the knee. Varying views are held toward treatment but most observers are agreed upon the exacting requirements for reduction and the difficulty of meeting such requirements. Early mobilization is emphasized. Most men delay weight-bearing for ten to twelve weeks.

Wilson and Cochrane[20] recommend manipulation and very early motion with traction maintained. If manipulation is not sufficient, the condyles are pressed into place by the use of carpenter's clamps as described by Scudder. Favorable cases (i.e., those with large fragments or condyles separated as a whole) lend themselves readily to open operation. A wire bolt

Fig. 9. C. Z., aged forty-five. Fracture of the lateral condyle as a whole. Position improved by manipulation. Functional result excellent with normal motion and stability.

passed through both condyles and tightened holds the fragments firmly and permits early motion.

A similar operative method is used by Webb.[21] Non-operative means, such as manipulation and carpenter's clamps, are first tried and operation reserved for suitable cases that have not responded to more simple measures. The more severely comminuted fractures are treated by continuous traction in a Thomas splint with a Pearson attachment to permit early motion in the knee.

Forrester[11] has modified the carpenter's clamp by adding concave adapters to fit the tibial head. After reduction, a circular cast is applied and the joint immobilized for ten days. Elliptical pieces of the cast are then removed from in front and behind the knee, and knee joint hinges are incorporated into the cast. Motion is started and increased each day until full flexion is obtained. Weight bearing is started at the end of ten weeks.

Magnuson[15] advocates Forrester's method.

Cubbins[8] and associates believe that the torn lateral meniscus is commonly interposed between the fragments and prevents complete reduction. Detached pieces of articular cartilage and fragmented pieces of meniscus become free bodies and predispose to arthritis. Open operation to remove these fragments and to elevate the depressed comminuted condyle is recommended. Operation is delayed for three weeks until the fragments of the shattered table become annealed by early callus. An incision is then made opening the joint and exposing the head of the tibia. Loose bodies are removed, the meniscus excised, and the depressed table elevated by an osteotome, and braced with bone chips removed from the tibia. A cast is applied and mobilization delayed four to five weeks. Excellent results in approximately fifty operated cases are reported. Cubbins believes that 40 per cent of the fractured condyles can be markedly improved by operation.

Cotton[6] has tried open operation on badly comminuted condyles and has abandoned it. (Apparently he operated early without waiting for callus.) Reducing the displaced condyle by manipulation and finger pressure, he holds the position either in a plaster cast or in a Thomas splint with traction and with Pearson's screw pad plates pressing against the condyles. To assist finger pressure in stubborn cases he prefers the hammer to pressure clamps. Even though joint motion is limited in some cases, none of the properly treated cases had lateral instability.

Fig. 10. M. B., aged forty-nine. Moderate depression and spreading of lateral condyle. To recognize the full extent of the depression, oblique views are needed. Position not improved by manipulation. Functional result fair with 105° of flexion but with lateral instability.

Clark[2] uses the redresseur on spread but not on depressed fractures. If the condyle is depressed as a whole, he does an immediate operation with fixation. In depressed comminuted fractures, he waits three weeks and then elevates the condyle as described by Cubbins. Mobility also is delayed eight to twelve weeks.

Fripp[12] operates only on condyles displaced as a whole but not on those which are comminuted. Mobilization is started after six weeks.

Swett,[19] Collins[3] and Eliason[10] frown on open operations and report satisfactory functional results by closed methods only. Eliason and Swett mobilize after six weeks, Collins after four weeks, and Sever[17] not until after eight or nine weeks.

Even with satisfactory functional results, most men report a persistence of a varied degree of valgus deformity. Cubbins prevented such deformity in his operated cases by building up the posterior position of the condyle a little higher than the normal.

The reviewer is left with the feeling that in severe cases uniformly perfect results are unattainable and the results obtained depend more upon the surgeon than upon the method.

Conclusions

1. The inclusion of more than one fracture entity under the same descriptive term is confusing.
2. The term "bumper fracture" of the tibia should be applied only to fractures of the shaft in which the history, level, or the characteristics of the fracture indicate that the bumper of an automobile was the agent which produced the injury.
3. Cotton's term "fender fracture" as applied to depressed fractures of the lateral condyle of the tibia is probably more accurate than Cubbins' term and should be retained.
4. The two pin fixation method shortens hospitalization, avoids repeated manipulations, and is a desirable form of treatment for most fractures which require skeletal traction.
5. Preservation of function is more safely accomplished by weight-bearing within the cast than by early massage and mobilization of contiguous joints.
6. Anatomic restoration of the knee joint is so important to a good functional result that open reduction and fixation is warranted in those cases in which other means fail to bring about such restoration.
7. Cubbins' method of delayed elevation of

the depressed and badly comminuted condyle offers encouraging results and should be considered for these otherwise irreducible injuries.

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END-RESULTS OF TREATMENT OF URINARY INFECTIONS BY THE KETOGENIC DIET*

HENRY A. BUCHTEL, M.D., and EDWARD N. COOK, M.D.

Rochester, Minnesota

SINCE the introduction by Helmholz[4] and Clark,[1] in 1931, of the ketogenic diet as a means of treating urinary infections, much has been written of its efficacy in producing immediate sterilization of the urine. As yet, however, little has been found out about the final results, that is, how long the urine will remain sterile. We have recently sent questionnaires to 200 patients who had been dismissed from the clinic a year or more previously with sterile urine following treatment by means of the ketogenic diet. The average length of time since dismissal in these cases was two years. We chose patients consecutively from two groups, one group made up of patients who had been treated in 1931 and 1932, and the other made up of patients treated in the last months of 1933 and early months of 1934. This was done to see if the changes made in the management of the diet made any difference in the end-results. Patients in the first group had been kept on the diet for a longer time, usually from three to four weeks, whereas those in the latter group had been kept on the diet usually only until two sterile cultures of the urine were obtained on successive days. In addition, the diet used in the latter group of cases contained a higher ratio of fatty acid to glucose.

We have tried many diet ratios and methods of handling patients on the ketogenic diet, and perhaps it is not out of place here to include a brief résumé of our present management. We are now using a diet with a ketogenic-antiketogenic ratio of 4:1, that is, the substances producing ketosis (90 per cent of the fat and 46 per cent of the protein) divided by the substances preventing ketosis (100 per cent of the glucose, 10 per cent of the fat, and 58 per cent of the protein) equals 4. We have found that, other things being equal, the higher the ratio of ketogenic to antiketogenic substances in the diet, the faster ketosis is produced; and as a general rule, the more rapid the production of ketosis, the more intense the ketosis. It has also been found that by such means a higher percentage of patients will secure adequate ketosis. Although a 4:1 ketogenic-antiketogenic diet approaches the limit of palatability, strange as it may seem since we have increased this ratio we have also diminished the complaints about the diet. We believe this paradox can possibly be explained by an im-

*From the Section on Urology, The Mayo Clinic, Rochester, Minnesota.

proved diet service: Every effort is made to please the patient's appetite, and the food is served as attractively as possible. Too much emphasis cannot be placed on the importance of hot food, as cold, greasy foods are most distasteful. The need of the closest coöperation between physician and dietician is, therefore, evident.

Acidifying drugs are used when necessary. While, theoretically, there may be advantages in always employing them in conjunction with the ketogenic diet, it is certain that they should not be used when the diet is begun or in some cases ketosis will develop after control of the pH has been lost. Ammonium nitrate and ammonium chloride are the best single acidifiers, and a combination of either of these agents with dilute inorganic acids gives the best known acidification. There is little difference between the various inorganic acids.

A large proportion of patients starting the ketogenic diet will complain of malaise, nausea, and vomiting. We believe that this is attributable to ketosis, and that any ketogenic diet which aims to avoid this complication probably does not produce a very intense ketosis. In our experience the management of these unpleasant symptoms is made much easier if patients are forewarned of the probable occurrence of such symptoms and are told that their presence is an indication that the diet is producing the desired result, thus enhancing the possibility of cure.[3] The importance of skipping a meal or two as a means of relieving nausea must be borne in mind; it is distinctly helpful. We have found, too, that ginger ale and chewing gum made for diabetic patients are also of definite value in alleviating these unpleasant reactions. Exercise is probably the best remedy for the symptoms of ketosis. The exact effect cannot be explained, but there is no doubt, clinically, that the more exercise that is taken the better. The ketogenic diet does not produce severe acidosis when the metabolism is normal and has never produced an acidosis that could not easily be controlled by the oral administration of glucose. Patients with abnormal metabolism must be followed more carefully. Diabetics, with the exception of those with the mildest forms of diabetes, should be hospitalized. Those with a gouty diathesis should be on a purine-free diet, should be under treatment for gout, and daily estimations of the uric acid content of the blood should be made. Even with the most careful precautions an attack of gout is usually precipitated. The patient and physician should in such cases decide whether the cure or the disease is worse. Continual coöperation between the physician and patient is a necessity if this treatment is to be at all successful.

TABLE I. INCIDENCE OF RECURRENCE AMONG 161 PATIENTS WITH BACILLARY INFECTIONS WHO HAD BEEN TREATED BY THE KETOGENIC DIET

	Patients	Per cent
Total	161	100
Recurrence	42	26
No recurrence	119	74
Total males	74	100
Recurrence	14	19
No recurrence	60	81
Total females	87	100
Recurrence	28	32.2
No recurrence	59	67.8

Bactericidal urine (urine with a beta-oxybutyric acid concentration of more than 0.5 per cent combined with a pH of less than 5.5)[5] will develop under the management just described in five out of six cases, and sterile cultures of urine will be obtained in two out of three cases of bacillary urinary infection.[2] As it would be unfortunate to have to abandon a method of treatment as successful as the ketogenic diet because of poor end-results, we were greatly encouraged by the 161 replies to the questionnaire, Table I. In making this table, any urinary symptoms the patient had after leaving the clinic, no matter how mild or of how short duration, were considered as a recurrence. Included also under recurrences are all those cases in which patients returned to the clinic for re-examination and were found to have bacteria in the urine. For the same reason, probably, that fewer men than women are afflicted with chronic urinary infection, the incidence of recurrence among men was found also to be lower.

The various organisms found on recurrence of infection are given in Table II, and the percentage of instances in which the respective organisms occurred is also given. As will be seen, Aërobacter aërogenes was found in a considerable number of cases in the series. It is our experience that this organism responds well to the bactericidal properties of ketonurine; it apparently is the source of recurrence in about the same

TABLE II. INCIDENCE OF RECURRENCE ACCORDING TO THE VARIOUS ORGANISMS FOUND

	Escherichia coli, 74.2 per cent*		Aerobacter aërogenes, 13.8 per cent*		Proteus, 4.8 per cent*		Pseudomonas, 3.6 per cent*	
	Cases	Per cent	Cases	Per cent	Cases	Per cent	Cases	Per cent
Total	123	100	23	100	8	100	6	100
Recurrence	32	26	4	17.4	4	50	1	16.6
No recurrence	91	74	19	82.6	4	50	5	83.4
	Salmonella, 1.8 per cent*		Alcaligenes, 1.2 per cent*		Shigella, 0.6 per cent		Grand total	
	Cases	Per cent	Cases	Per cent	Cases	Per cent	Instances†	Per cent
Total	3	100	2	100	1	100	166	100
Recurrence	1	33.3	0	0	0	0	42	25
No recurrence	2	66.6	2	100	1	100	124	75

*Percentage of instances in which respective organisms were found.
†In some cases more than one organism was found, hence number of instances is greater than number of cases.

TABLE III. TIME OF DEVELOPMENT AND SEVERITY OF RECURRENCE

	Recurrence in										
	0 to 3 months		3 to 6 months		6 to 12 months		1 to 2 years		2 years +		
	Mild	Severe	Mild	Severe	Mild	Severe	Mild	Severe	Mild	Severe	
Males	4	4	0	1	2	1	1	0	1	0	14
Females	7	3	2	1	2	1	9	0	3	0	28
Total	11	7	2	2	4	2	10	0	4	0	42
Grand total	18		4		6		10		4		42
Per cent	60.1		0.9		14.3		23.8		0.9		100

proportion as the other organisms. It will be noticed that there is no important difference in the incidence of recurrence of the various organisms with the exception of Bacillus proteus. This organism is not only the most difficult to eradicate from the urinary tract, but it also has a high incidence of recurrence, and since this organism is seldom, if ever, a normal inhabitant of the urinary tract, the importance of asepsis in urologic technic can be seen. In the cases in which multiple organisms were originally present, never more than one type of organism was present on examination following recurrence.

There was a large number of early recurrences, Table III. Of course, there is some doubt as to whether these are all real recurrences or whether they are not merely continuations of the original infection. In reviewing the cases in the 1931 and 1932 group, in which the patients were kept on the diet for a considerable time, only one woman had early recurrence. Three men had early recurrence of infection, all of whom had severe prostatitis. Two of these men, if they were to enter the clinic now, would be subjected to transurethral procedures on the prostate gland because of old prostatic abscesses.[7] In other words, in spite of the prolonged course on the ketogenic diet, the urinary infection is these cases was probably not eradicated. Rector and Wheeler,[6] as well as Wilson,[8] have advised one week on the ketogenic diet after the culture of the urine is sterile, and Clark does not dismiss patients until three negative Gram-stains at intervals of two days have been obtained.

It seems clear that we have not been demanding sufficient evidence that the infection has been eradicated. We do not plan to return to a three-week course of diet, but we do plan to increase the number of sterile cultures of urine before the patient is dismissed. The use of the Gram-stain is an important aid in judging when the infection is eradicated. When the number of bacteria is small, as it will be when the urine is bactericidal, the urine should be centrifuged for a short time to clear it of pus, then the cleared urine should be centrifuged at high speed for at least an hour. The sediment obtained should be examined carefully. Culture of the urinary sediment after this method has been employed will reliably indicate whether or not the infection has been eradicated. If one is not pressed for time, it is certainly the wisest procedure to continue

the ketogenic diet as long as the urine remains bactericidal. However, when time is an important factor, the patient must be taken off the diet as soon as it is absolutely safe to do so.

Seventy-four per cent of the recurrences were classified as mild, and in several cases they were probably not true recurrences. For example, one woman complained of urinary symptoms on passage of a stone a year after dismissal; another woman had urinary symptoms following postoperative catheterization nine months after treatment by ketogenic diet. Four of these patients with recurrences have returned to the clinic for further treatment and have remained well following a second course on the ketogenic diet.

A subject of utmost interest to the patients is the proper regimen for them to follow after dismissal so as to minimize the possibility of recurrence. Many will have the idea that their diet should continue to be high in butter and cream. This, of course, is not so, as there is only one kind of effective ketogenic diet and that is the one which produces sufficient ketosis to raise the beta-oxybutyric acid concentration of the urine to at least 0.5 per cent. Routinely we advise continuation of urinary acidification for ten days after the ketogenic diet has been stopped, and the taking of acidifying drugs thereafter during alternate weeks for six or eight weeks. Foci of infection should be eliminated, if possible, and intestinal stasis, if present, should be corrected. The exact rôle of these two factors in the production of urinary infection has not definitely been settled, but we have seen many cases in which foci of infection seemed to play a large part.

Much more definite causes of recurrence are anomalies of the urinary tract and foci of infection within the urinary tract itself. The part such anomalies play in producing urinary stasis and resulting infection is well known. Among men, prostatitis is evidently the single greatest cause of recurrence, and to be more specific, prostatitis caused by a bacillus, of which Escherichia coli is the chief offender. This is so invariably true that we believe we can predict with great accuracy whether recurrence will develop merely by culture of the prostatic secretion after the urine has been sterilized. The treatment of prostatitis, then, becomes an important adjunct to treatment with the ketogenic diet. By analogy one would expect that the foregoing would be true also of the female urethra, but so far we have little evidence to support such an idea; nevertheless we advise eradication of foci of infection in the female urethra also. This would seem to make a strong case for the hypothesis of ascending urinary infection; it must be remembered, however, that in many cases of recurrence the mode of infection cannot be determined.

Once recurrence has developed, use of the ketogenic diet at home has a definite place in the treatment. While some authorities believe that the ketogenic diet can be administered only under conditions approaching hospitalization, we have found that patients can follow the diet at home quite well, especially if it has previously been followed under supervision. There is no doubt that the low-calorie diet advised by Nesbit has great possibilities for use in the home. However, it has been our experience that a diet low in calories does not produce as rapid or intense ketosis as does one high in calories. A ketogenic diet for home use, which has been quite successful, together with a few suggestions as to its application, is given in Table IV. This diet for use in the home has a 4:1 ketogenic-antiketogenic ratio, which is the same as is used now at the clinic. It can be prepared and followed quite easily and has proved in our experience to be an adequate means of treatment.

Fourteen of the 42 patients who suffered from recurrence of urinary infection followed this home diet. All reported benefit; three said they were cured, eight that they were markedly benefited, and three reported moderate relief of symptoms. Two additional patients reported control of their symptoms by the use of acidifying drugs alone.

TABLE IV. KETOGENIC DIET FOR USE IN THE HOME

General Instructions: 1. This diet is most valuable in the treatment of bacillary infections. Identification of the specific bacteria present may be made by Gram-staining the urinary sediment or by culture of the urine.

2. A bactericidal urine is necessary, that is, the pH of the urine should be less than 5.5 and the concentration of beta-oxybutyric acid in the urine should be 0.5 per cent or greater.

3. Acidifying drugs are used only when sufficient acidification of the urine does not develop from ketosis alone.

4. Daily observation of the patient and appropriate tests of urine are essential. This should include: de-

termination of the pH, estimation of the concentration of beta-oxybutyric acid, and examination of the wet smear from the urinary sediment and of the Gram-stain of the dried smear.

5. The treatment of associated coccus infections should not be neglected. Neoarsphenamine, 0.3 gm. at intervals of five days for three doses, is of value.

6. Foci of infection elsewhere in the body and associated pathologic conditions in the urinary tract should be treated. In almost all cases this will include the treatment of prostatitis in males and of urethritis in females.

7. The ketogenic diet is a diet very low in carbohydrate and high in fat. It must be adhered to strictly. No other foods, medicines, or liquids except those prescribed can be taken. Chewing gum, chewing tobacco, saline or sweetened cathartics, and alkalies of any kind are forbidden. Water in moderate quantities is allowed.

8. Malaise, nausea, and vomiting are frequent complications of ketosis. Small sips of unsweetened tomato juice, orange juice, or ginger ale (which have no food value) may relieve the symptoms and enable the patient to continue the diet. If nausea persists, it may be advisable to decrease the total intake of food to one-half, or to institute a day of fasting. Considerable exercise seems to make patients tolerate the diet better.

9. Constipation can be treated by agar-agar, mineral oil or *bitter* cascara.

10. The diet should not be continued after ketone bodies have disappeared from the urine: ordinarily this will be about ten days after the diet is begun. It must be remembered that a second course on the diet after a rest period of two weeks may be more successful.

11. Ketosis must be developed and maintained. It should be stressed that good results will be obtained by the ketogenic diet only when these instructions are followed implicitly. Especially is it important that the patient coöperate completely and that the physician follow meticulously the patient's daily progress.

Ketogenic diet.—A, B and C of printed instructions.

A

KETOGENIC DIET

Breakfast

Egg	1
Bacon	5 strips
Cream (40% fat)	½ cup
Butter	2 squares
Coffee	

Lunch

Eggs or meat substitution	2
Vegetables or Salad (1 serving)	See list of foods allowed
Butter	4 squares
Cream (40% fat)	1 cup

Dinner

Clear broth (if desired)	
Meat	1 small serving
Vegetables or Salad (1 serving)	See list of foods allowed
Butter	4 squares
Mayonnaise or French dressing (see recipe) or Butter	1 tablespoon
Cream (40% fat)	1 cup

FOODS ALLOWED

I. Meats, Fish, Cheese and Eggs

Any kind of meat or fish is allowed, but fat meats are preferable. All meats are prepared without the addition of flour. Butter allowed in the diet may be used in the preparation of foods. Eggs or cheese may be substituted for meat.

1. Two eggs in place of one serving of meat.
2. Two one-inch cubes of American cheese in place of one serving of meat.
3. One egg and 1 extra square of butter may be used in place of 5 strips of bacon.

Meat servings.

1. Pork chops	1 medium
2. Steaks	1 small
3. Roast lamb	1 small serving
4. Lamb chops	2 small chops
5. Roast beef	1 small serving
6. Sardines	¼ of a six ounce can
7. Salmon	⅛ of a 16 ounce can
8. Chicken	1 thigh or equal amount
9. Goose	½ thigh or equal amount
10. Duck	same as chicken

II. Vegetables

1. Tomatoes	½ cup
2. Spinach	½ cup
3. Tiny string beans	½ cup
4. Stewed cabbage or sauerkraut	½ cup
5. Stewed celery	½ cup
6. Asparagus	3 stalks
7. Cauliflower	1 small section

B

III. Salads

Salads may be made of vegetables listed

1. Lettuce	⅙ small head
2. Fresh tomato	2 small slices
3. Asparagus	3 stalks
4. Shredded cabbage	1 cup lightly packed
5. Tomato and cucumber	1 slice tomato 3 slices cucumber
6. Tomato and lettuce	1 slice tomato ⅛ head lettuce
7. Celery heart and radish	¼ celery heart 1 radish
8. Lettuce and cucumber	⅛ head lettuce 3 slices cucumber

IV. Breads

Six slices of aerated bread, ¼ inch thick, may be taken daily if desired. (Purchased from Montgomery Ward and Co.)

Cellu Bran Wafers (1 each meal if desired; have no food value; purchased from Chicago Dietetic Supply Co.)

V. Soups (no flour to be included in the making of these)

1. Any meat broth
   (May be taken if desired. It has practically no food value.)
2. Cream soups
   (Made of vegetable and cream allowed in the diet.)
3. Vegetable soup
   (Using vegetables allowed in the diet in combination with meat broth.)

VI. Butter and Mayonnaise (see recipe for mayonnaise—commercial mayonnaise is to be avoided)

1. Butter may be used in preparation of meats, eggs, vegetables and broths or soups.
2. Butter may be used in place of mayonnaise. 1½ squares (15 gms.) butter for 1 tablespoon (15 gms.) mayonnaise.
3. Total butter for day should be 1/5 to ¼ pound. This is best measured out in the morning and consumed by the end of the day.

VII. Cream

It is very important to use heavy whipping cream (40% fat content). If 40% cream is not available, the diet must be recalculated and more butter and mayonnaise added. Cream may be used in preparing custards, ice cream, cream soups, egg-nog and cocoa, and on vegetables. If required amount of cream cannot be tolerated at meal time, it may be taken between meals with coffee, or as cocoa or egg-nog.

VIII. Beverages

Coffee
Tea
Egg-nog
Cocoa—hot or cold
(Saccharin may be used as a sweetening agent.)

IX. Condiments

Salt
Pepper
Vinegar
Spices

C

RECIPES

Mayonnaise

Salad oil	1¼ cups
Paprika (if desired)	⅛ teaspoon
Vinegar	1½ tablespoon
Salt	¼ teaspoon

Two egg yolks

Have all ingredients cold. Beat egg thoroughly. Add 2 tablespoons of oil slowly, drop by drop, beating constantly. Then add 1 teaspoon at a time until the mixture thickens. When very thick add ½ tablespoon vinegar. Add the remaining oil more rapidly, beating all the while. Finally add the salt, paprika and the tablespoon of vinegar. Place the mayonnaise in a jar and keep in a cool place.

Ice Cream

Cream, 40%	50 gms. or ¼ cup
Egg, ½	25 gms.
Water	½ tablespoon
Saccharin	¼ grain
Vanilla	

Method: Beat egg until very light, add saccharin which has been dissolved in water. Fold in whipped cream, add vanilla. Freeze.

Egg-nog

Cream, 40%	½ cup
Water	¼ to ½ cup to thin cream
Egg	1
Saccharin	½ grain
Vanilla	Few drops

Cocoa

Cocoa	½ teaspoon
Cream, 40%	½ cup
Water	½ cup

Saccharin—½ grain may be added if desired.

INSTRUCTIONS TO THE PATIENT

1. Satisfactory results cannot be obtained unless this diet is followed absolutely as outlined. Even the smallest deviations from this will ruin the chance for success of this treatment.
2. No food or beverage other than that listed is to be taken.
3. Water may be taken in moderate quantities as desired.
4. The chewing of gum or tobacco is not permitted. Smoking is allowed.
5. No cathartics are to be used other than mineral oil or *bitter* cascara.
6. Do not take any medicine unless prescribed by the physician. It may conflict with the diet.
7. Do not use tooth paste.
8. Stay on the diet 10 to 12 days. The last 8 to 10 days, take 12 pills* daily.

*The pills referred to are ammonium nitrate or ammonium chloride, 0.5 gm. each.

Summary

Of 161 patients with bacillary infections who replied to questionnaires and who had been treated by means of the ketogenic diet on the average of two years previously, 26 per cent suffered recurrences. There was little difference in the incidence of recurrence of the various bacilli.

In the majority of cases recurrences were mild and occurred within the first three months.

A ketogenic diet suitable for use in the home is outlined.

Conclusion

The ketogenic diet is a successful method of treatment, not only in regard to the immediate, but also the end-results.

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MEDICAL QUESTION COURT*

W. A. O'Brien, M.D., Presiding

THE following questions were submitted by members of the Minnesota State Medical Association prior to the annual meeting and were given to the physicians and surgeons who made reply forty-eight hours in advance of the meeting. The answers here published were given as a part of the regular program of the convention.

How does one treat nail biting in small children?

DR. H. F. HELMHOLZ, Rochester, Minnesota: The treatment of nail biting in children is not a simple thing. The matter of restraint, mechanical devices of various kinds, and threats usually are not of any great value.

It is important to call the attention of the child to the fact that he is biting his nails, without irritating him. A simple method I have used with one of my children was to call him by a different name than I usually called him when I wanted to call his attention to the fact that he was biting his nails. It worked very well, and I have given it to other people. The youngsters do not know they are biting their nails, and if you can call their attention to the fact without saying, "Shop biting your nails," which will irritate them, you will help them and not lose their coöperation. Appeal to their pride. Tell them that it is something they can get over and will get over if they will just watch themselves.

Then there is the matter of release of tension, which is unquestionably an important factor. They do it at times when they are under tension, when they are excited, when they are receiving a reprimand, when they are going to exciting movies, or under any strain. That must be taken care of in the best possible way, and, in the same way, see that they are getting plenty of rest.

Locally, it is well to avoid all irritation, hang nails, to see that the cuticle is kept down as much as possible, and inasmuch as most of these children are girls it would be well to give them a manicure set so that they can keep their nails in the best possible condition. Encourage them and help them as much as possible in overcoming this tension.

What are the indications for the use of the extract of the whole adrenal gland?

DR. D. L. WILBUR, Rochester, Minnesota: The suprarenal gland contains three substances that are particularly valuable so far as physiologic processes are concerned. These are: cortin; ascorbic acid, or vitamin C; and adrenin.

Most extracts of the suprarenal gland do not contain sufficient quantities of cortin, if they contain any of it, to be physiologically significant.

Cortin has been used in recent years in the treatment of Addison's disease. Studies on the metabolism of sodium and potassium in cases of Addison's disease have indicated that in many such cases cortin is not an essential part of treatment. It seems apparent that cortin will be of value principally in cases in which patients are in the crisis of Addison's disease, in cases in which surgical shock develops following operations on the suprarenal gland, and possibly in cases of severe infection or toxemia.

Please describe the treatment of trigeminal neuralgia.

DR. A. W. ADSON, Rochester, Minnesota: Before answering the question perhaps it might be well to define the term "trifacial neuralgia." Trifacial neuralgia is frequently described as tic douloureaux. This disease is a distinct entity and occurs in middle life or later. It is characterized by sharp, lancinating, stabbing pains that occur in paroxysms and involve one or more branches of the trigeminal nerve.

The treatment of the disease consists either in palliative relief or permanent relief by injecting alcohol into the involved branch or sectioning the sensory root. The alcohol produces a most effective result when it is injected into the nerve as the individual branches leave the foramina of the skull. Seven out of ten injections are successful and the average time of relief from the paroxysms of pain is about eighteen months. The injection may be repeated as the pain returns but eventually scar tissue forms which prevents subsequent successful injections. Therefore, one to three injections are employed before advising and performing the radical operation of section of the sensory root. The injection of alcohol is indicated chiefly when there is but one branch involved and when there is some doubt as to whether or not the facial pains are the result of trigeminal neuralgia. A successful alcohol injection with the resulting anesthesia always offers temporary relief from the pain when it is the result of trigeminal neuralgia but rarely offers any relief when the pain is due to other causes than trigeminal neuralgia.

Permanent relief is obtained by the radical operation which consists of a total or subtotal section of the sensory root. The sensory root which is situated posterior to the ganglions may either be exposed through a transtemporal approach or a suboccipital approach. Most of the neurosurgeons, as well as I, prefer to employ the transtemporal approach. This exposure allows one to do a subtotal section if the disease is limited to the third branch or a total section if more than the third branch of the trigeminal nerve is involved.

When is a patient cured of syphilis?

DR. PAUL A. O'LEARY, Rochester, Minnesota: At the Dermatological Congress in Budapest last fall there was a symposium on the cure of syphilis. It was universally agreed by all the participating speakers that acute syphilis is curable. In all the other manifestations of syphilis, however, the use of the word "cure" is not applicable because in these patients the word "arrest" is as near as we can come in saying that the patient has been rid of the disease.

The criteria of the cure of syphilis may be summarized briefly as follows: In a patient who started treatment during the early phase of syphilis and who received an adequate amount of treatment, if the blood Wassermann and a spinal fluid findings remain negative and a general examination shows no evidence of cardiovascular disease or other signs of syphilis, and if the examination and tests remain negative for three years, we can then classify this patient as cured. Each year thereafter that the serology and the clinical signs remain negative, the probability of cure increases. A small percentage of the patients who acquire syphilis cure themselves spontaneously. It is because of this inherent ability that certain patients have been cured of syphilis with only a few injections of arsphenamine. As we have no way of determining beforehand the patients who have a sufficient resistance to the disease from those who are lacking in the defensive mechanism, it

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is imperative that all patients with early syphilis undergo adequate treatment.

What is the value of curettage in dysmenorrhea?

DR. J. C. MASSON, Rochester, Minnesota: In spite of the fact that many authorities in gynecology condemn the use of the curette in the treatment of dysmenorrhea, the fact remains that a large per cent of women are helped by a dilatation, and we must include dilatation with the use of the curette in any of these cases. The use of the curette without dilatation is a real danger because of injury to the endocervix and the possibility of stenosis afterwards. The use of the curette and dilatation, while it does not cure in many cases, gives a higher percentage of relief to these patients than any other method.

In women who are more or less incapacitated for one, two or more days at each monthly period, we must keep in mind that if nothing is done to help them they are very apt to become neurotic and incapacitated to such an extent that they are not able to hold a job. If the curette will help them for two or three months at a time, I feel that it is advisable even if it has to be repeated. In cases of acquired dysmenorrhea due to a submucous polyp or fibroid or even when it is due to hypertrophy of the endometrium, especially of the polypoid type, a thorough dilatation and curettage is often of definite help. While we must condemn the indiscriminate use of the curette, and feel there is great danger done to the pelvic organs by its unnecessary and unscientific use, we have to keep in mind that it is one method of helping these patients.

In cases with severe dysmenorrhea, the operation of cutting the presacral nerve probably holds out the best hope of permanent cure, but, of course, is a major operation.

Is detachment of the retina ever cured?

DR. W. L. BENEDICT, Rochester, Minnesota: Spontaneous recovery is the rule in retinal detachment accompanying retinitis of pregnancy. Detachment from other causes is curable by surgery in from 45 to 90 per cent of the cases. Recent improvements in methods of diathermy have made it possible to repair tears in the retina about the posterior segment of the eyeball, accounting for the marked increase in cases cured. The most satisfactory results are obtained in cases of recent detachment. After several months of detachment, the retina becomes atrophic and function may not be resumed even though the retina is entirely replaced. In cases of complete detachment of the retina, it is not always possible to secure a satisfactory reattachment, but if operated before atrophy ensues, a portion of the retina may become reattached so that partial visual function can be resumed.

One of my patients has heard that leukoplakia may turn to cancer. How can this be prevented?

DR. F. A. FIGI, Rochester, Minnesota: There are three distinct types of leukoplakia, ordinary squamous, papillary and syphilitic. All of these occur much more commonly in men than in women.

The squamous type, which is that most commonly seen, most often results from excessive use of tobacco, although it may develop following chronic irritation from any other source. Ordinarily, it is of no particular significance unless it becomes definitely thickened and leathery. Then these thickened areas are prone to develop malignant change at their base, and removal is accordingly advisable.

The papillary or warty type of leukoplakia is comparatively rare. This type of lesion is potentially malignant. It is very prone to develop into the so-called frozen-door, mat type of squamous-cell epithelioma, and should always be removed regardless of its situation or the length of time it has been present.

The syphilitic type, occurring most commonly just inside the angles of the mouth and over the dorsum of the tongue, is very prone to develop malignant change in any areas of thickening and should accordingly be removed promptly.

The best means of dealing with leukoplakia is either wiping it off with the actual cautery, using electrocoagulation lightly, or excising the affected region. Personally, I prefer to excise these areas and then suture, approximating the margins carefully with fine catgut or silk so that a minimum of scarring remains.

I have difficulty in interpreting films of my tuberculin positive adult patients. Where can I get a book which will help me be certain of my diagnosis?

DR. J. D. CAMP, Rochester, Minnesota: To the general physician who is interested in learning more about roentgenology of the chest, I can recommend two books, one by Wessler and Jaches, published by the Southworth Company, Troy, New York, in 1923, and the other by Sante, which was published by Hoeber, Inc., of New York in 1930.

The interpretation of roentgenograms of the chest is one of the most difficult phases of roentgenology and cannot be practiced by a combination of textbooks and an x-ray machine. It requires considerable experience and study and the careful application of the principles which are fundamental to all roentgenologic interpretation.

One of my patients was found after x-ray diagnosis to have osteoarthritis of the lumbar spine. What is the treatment?

DR. HENRY W. MEYERDING, Rochester, Minnesota: The treatment of osteoarthritis of the lumbar vertebræ depends somewhat on the age of the patient and on the symptoms. If there is a localized involvement following injury, the condition may be the result of injury of bone and hemorrhage, in which case a period of rest in a recumbent position would be indicated; later, a spinal support is advisable. When the arthritis has become more marked, the limitation of motion of the spinal column and limitation of expansion of the thorax, braces should be applied to prevent flexion deformity. The removal of foci of infection in the teeth, tonsils, and prostate, combined with baking and massage of the back afford considerable relief. In instances in which pain persists and is localized, as in the lumbosacral joint, and all forms of conservative measures fail to give relief, fusion or arthrodesis may be indicated.

I have recently heard of the x-ray diagnosis of placenta previa. I am not familiar with the technic or its value.

DR. R. D. MUSSEY, Rochester, Minnesota: A couple of years ago, Urner described a technic in the diagnosis of placenta previa.

As you know, during the third trimester of pregnancy, the presenting part will be in contact with the bladder unless there is some pelvic disproportion. Urner determined that if a solution opaque to the x-ray was injected into the bladder, the presenting part could be shown by x-ray to be resting on the bladder. Urner used sodium iodid in his work. We have been using 20 to 30 c.c. of 5 per cent solution of silver iodid mixed with an equal amount of an emulsion of olive oil.

When a woman has placenta previa and there is no disproportion between the fetal head and the pelvic inlet, the presence of the placenta prevents the head from resting down on the bladder; in such an in-

stance, following injection of this solution into the bladder, the x-ray shows that the fetal head does not rest on the bladder. It is important to have the bowel empty when the picture is taken. We have used it in several instances and have found it to be of assistance in making the diagnosis of placenta previa.

What is the best treatment for an ordinary uncomplicated case of acute pyelitis in children?

DR. H. F. HELMHOLZ, Rochester, Minnesota: I think there can be no question that the most important point in the treatment of acute pyelitis is ample diuresis. In childhood simple pyelitis is a disease that runs a favorable course whether treatment is given or not. Unquestionably, a great many cases of pyelitis are never recognized. Give plenty of fluids to the patient so that you are constantly washing out the urinary passage and, in addition, administer alkalis, sodium bicarbonate and sodium citrate equal parts, up to alkalinization of the urine.

Most simple cases yield to this therapy, and it is surprising to see, where cultures are taken and the number of organisms determined in the urine, how small a number of organisms you may have with still large amounts of pus in the urine.

If, after a short period of time, the infection persists, I think the newly introduced mandelic acid given with ammonium chloride will very rapidly clear up the infection.

We have recently treated a number of patients whose urine has been sterilized within forty-eight hours.

Sharply to be separated from these cases of simple pyelitis is the group in which there is some obstruction in the urinary passages. It is extremely difficult to clear up the infection in this group.

In patients not showing allergic symptoms elsewhere, how does one make a diagnosis of gastro-intestinal allergy?

DR. D. L. WILBUR, Rochester, Minnesota: The diagnosis under such circumstances is usually difficult. There are several methods of approach in making the diagnosis. The history may reveal a family incidence of allergic disease; there may be episodes of abdominal symptoms, most of which are referable to the colon. These episodes occur at intervals and often during certain seasons of the year. Such patients are frequently not neurotic and between attacks are free of symptoms. The presence of eosinophilia may lead to the suspicion of such a condition. Specific methods of diagnosis include skin tests, the keeping of a diary, and use of an elimination diet. Skin tests are probably not of much value but the latter two methods are frequently helpful. If symptoms clear up when the patient is taking an elimination diet, one should not immediately jump to the conclusion that the gastro-intestinal symptoms are the result of an allergic disturbance.

Is operation the only cure for Raynaud's disease?

DR. A. W. ADSON, Rochester, Minnesota: The answer is in the affirmative. However, if the symptoms are mild in character it is possible to ameliorate them by medical measures. This is accomplished by controlling the nervous phenomena which these patients so frequently exhibit, in addition to the avoidance of exposing the fingers and toes to cold temperatures.

The operation which has proved to be so effective in the relief of Raynaud's symptoms consists of an extensive sympathectomy. If the disease involves the fingers, a bilateral cervical thoracic sympathectomy is performed. When the disease involves the toes, a bilateral lumbar sympathectomy is performed. Regardless of the particular type of operation to be employed, it is extremely important to include in the resection all of the sympathetic fibers carrying vasoconstrictor impulse to the affected extremities.

Is it possible to desensitize a patient who is susceptible to poison ivy?

DR. PAUL A. O'LEARY, Rochester, Minnesota: Experiences differ greatly in the evaluation of desensitization to the Rhus toxicodendron. It is possible that the differences in the reported experiences are due to the fact that the local plant was not used in the preparation of the extract employed for the desensitizing. In other words, a poison ivy extract from a plant which is gathered in New York state is probably not of great value in desensitizing the individual here in Minnesota.

The reports indicate that the efforts of desensitizing by administration of the extract by mouth have been of little value. It is possible that some of the good results obtained by the injection method of desensitizing have been derived not so much from the injection of the Rhus toxicodendron antigen as from the fact that these patients eventually learn that if gasoline or kitchen soap, or some other alkali, is applied to the skin immediately after exposure to the poison ivy, they can prevent attacks. It is also likely that these patients undergo a desensitization to the Rhus as a result of contact. Accordingly, it is difficult to appraise the value of the poison ivy extracts because of the numerous factors which must be considered beside desensitization.

Do you recommend x-ray treatment for non-bleeding fibroids of the uterus?

DR. J. C. MASSON, Rochester, Minnesota: I can answer that question by one word—"No." I do not think there is any indication for x-ray or radium in fibroids unless associated with bleeding. If the tumor is large enough to give symptoms from pressure, or be an inconvenience to the patient, it could be reduced in size by x-ray, but I am satisfied that a more practical and better method, with very little risk, would be a subtotal or if advisable, a total hysterectomy.

I personally look upon the use of irradiation in benign tumors of the uterus as only indicated in cases of menorrhagia, at or close to the menopause.

Is it possible for a hyperopic child to pass a successful Snellen's School Chart test? If so, how does one detect these children in school work?

DR. W. L. BENEDICT, Rochester, Minnesota: The normal eye of a child is hyperopic. It may vary from one diopter to several diopters and still allow the child to pass the Snellen test. A child may carry up to five or six diopters of hyperopia without symptoms. A child who is asthenic or with a naturally weak ciliary muscle may complain of headaches, eye strain, blurred vision, with much less hyperopia than another who has no symptoms whatever. Unless there are symptoms of headache, eye strain, blurring of vision, a tendency to diplopia, or even to cross-eyes, one may not detect this hyperopia by any test that could be given to a school child. Furthermore, so long as a child carries a normal amount of visual acuity without symptoms, it is immaterial whether the hyperopia be corrected or not. It is impossible to tell by the Snellen Chart the character of the refractive error.

Whenever a child complains of his eyes, he should be sent to an eye physician. It is only possible to determine the amount of hyperopia by as nearly complete relaxation of the ciliary muscle as it is possible to obtain by the use of mydriatics. It is impossible to expect any mechanical device or any set of fogging

lenses, such as may be applied in the investigation by a non-medical person, to uncover the amount of hyperopia the child may have. However, it is only necessary to submit a child to these severe tests in case his symptoms are wearisome or persist.

Is it possible to have a salivary calculus without being able to show stone in the x-ray?

DR. F. A. FIGI, Rochester, Minnesota: More than nine out of ten salivary calculi occur in connection with the submaxillary salivary glands and ducts. Only a very small percentage of salivary stones form in the parotid gland or ducts. Often these stones do not show up in the roentgenograms for the simple reason that such roentgenograms are improperly taken, the mandible being superimposed over the salivary structures. If roentgenograms are taken by placing one of the larger dental films in the floor of the mouth and directing the rays through from below, these stones will show in practically 99 per cent of cases, if not more.

Will you please give me some practical pointers on getting better sinus x-rays? I do not seem to get enough contrast to be certain of my results.

DR. J. D. CAMP, Rochester, Minnesota: A fundamental requirement for successful roentgenography of the sinuses is good detail and generally if we correct the factors which influence detail, we will go a long way toward improving our results. Good detail is dependent on: (a) Adequate immobilization of the patient; (b) A fine focus tube—not over 3 mm. focal spot; (c) Good intensifying screens; and (d) Adequate film target distance—not less than 30 inches.

Frequently sinus roentgenograms fail to reveal the maximum amount of information obtainable by this method because the position best suited for the sinus under investigation has not been used. There are several standard positions for this work which are described in most text books concerning x-ray technic.

Routinely, it is not necessary or even desirable to have a great deal of contrast in sinus films, and the majority of radiologists do not recommend the use of a Potter Bucky diaphragm for this examination. Too much contrast will obscure the shadows of thickened or edematous mucuous membrane which occurs in a great majority of these cases.

What do you think of local anesthesia in treatment of fractures?

DR. HENRY W. MEYERDING, Rochester, Minnesota: I believe the use of local anesthesia depends considerably on the environment in which the individual works. In an institution where there are always anesthetists who are capable of giving careful scientific general anesthesia of varying types, spinal and general anesthesia are usually employed more often than local anesthesia.

As regards infiltration at the site of a recent fracture with novocain. This method, however, gives one an opportunity to aspirate hematomas. I believe there arises the possibility of infection by the introduction of a foreign substance. Good anesthesia and moderate relaxation may be obtained, but in many of the cases encountered one is dealing with old ununited fractures, malunions, and so forth, where local anesthesia is not used. However, regional or spinal anesthesia offer a great boon. When one is dealing with an old ununited fracture of the hip, spinal anesthesia permits one to apply a considerable amount of surgical treatment, without the added danger that might come from extensive operation plus a prolonged general anesthesia.

I believe in the conservative treatment of eclampsia. At a recent hospital staff meeting, one of our members stressed the radical form of treatment. Which one of us is right?

DR. R. D. MASSEY, Rochester, Minnesota: I agree with the doctor who brings up the question in regard to the conservative treatment of eclampsia. The pendulum has swung back and forth in this country for a matter of thirty years, and is now swinging more toward the conservative side.

During the White House Conference, a country-wide investigation was made, and it was found that the death rate from cesarean section after eclampsia was somewhere between 10 per cent and 20 per cent. The various statistical reports have shown that the conservative treatment of eclampsia has reduced the mortality to between 5 per cent and 10 per cent.

I firmly believe that before any method is undertaken for emptying the uterus the patient should be brought under conservative management, until such time as the convulsions have stopped and elimination is started.

In spite of cod liver oil, a recent baby patient of mine developed rickets. How does one explain this?

DR. H. F. HELMHOLZ, Rochester, Minnesota: I should like to ask on what basis the diagnosis of rickets was made, whether it was made on the diagnosis of a craniotabes, slight beading of the ribs, or whether it was actually made on the x-ray findings of the epiphyses and values of calcium and phosphorus in the blood.

We do know that when youngsters grow very rapidly, a breast-fed baby may develop extreme degrees of craniotabes so that there is the parchment-like feel to the back of the head. This, however, is not rickets.

On the other hand, he may have received cod liver oil that had been on the shelf for a long time or never had any vitamin content. Again, in a very rapidly growing child the usually adequate amounts of vitamin D may not have been sufficient to prevent mild rachitic change.

It may be that the child had some sort of gastrointestinal disturbance. Probably the most common is the celiac disease in which there is an improper absorption of the vitamin D.

What are the results of nonsurgical treatment of gallbladder disease with or without stones?

DR. D. L. WILBUR, Rochester, Minnesota: Surprisingly little is known about the results of nonsurgical treatment of disease of the gallbladder either with or without stone, despite the fact that disease of the gallbladder is the most common organic disease of the gastrointestinal tract.

One might consider this question from two aspects: first, the dyspepsia associated with gallbladder disease, and second, the results of treatment of colic. So far as the cholecystic dyspepsia is concerned, a large variety of types of medical treatment have been advocated, and if one reads the literature on this subject one receives variable impressions, because some workers have found the results are good, and others have found that they are poor.

It is fairly well accepted that a bland type of diet which contains a relatively small amount of fat and cholesterol and in which attention is given to correction of constipation has given good results in relieving many patients of the dyspepsia of cholecystic disease. The use of drugs, particularly cholegogues, such as bile salts, magnesium sulphate, and sodium phosphate, has frequently given symptomatic relief.

In general, the results of nonsurgical treatment of disease of the gallbladder, either with or without stones, are highly unsatisfactory. If disease of the

gallbladder is present, or if stones are present, the most satisfactory form of treatment of symptoms is surgical.

Are there any brain tumors that are radiosensitive enough to be successfully treated without operation?

DR. A. W. ADSON, Rochester, Minnesota: I doubt if there are any brain tumors that are actually destroyed by irradiation, but the vascular tumors are sufficiently radiosensitive to justify irradiation. Irradiation is frequently effective in producing vascular impairment in and about the tumor to such an extent as to cause the neoplasm to shrink in size and thus produce a marked relief in the symptoms which result from the increase in the intracranial pressure. Irradiation is most effective when employed subsequent to cranial exploration where one has been able to verify the extent and the pathologic nature of the inoperable tumor. Occasionally, one is justified in advising irradiation in cases in which tumors involve the brain stem and the basal nuclei, without exploratory craniotomy. The bilaterality of the symptoms and nuclear involvement are the clinical manifestations for such a procedure. Irradiation with roentgen rays or radium is occasionally indicated when recurrent symptoms develop, but the treatment should not be used promiscuously or repeatedly when definite relief is not obtained.

How does one make a diagnosis of cosmetic dermatitis?

DR. PAUL A. O'LEARY, Rochester, Minnesota: Cosmetic dermatitis is not confined solely to women who apply rouge, lip stick and powder to their faces. It may be observed on all parts of the body; for example, on the scalp from dandruff "cures," in the axillæ from deodorizing agents, and on the feet in individuals who have been endeavoring to overcome a bromidrosis.

The diagnosis of cosmetic dermatitis offers some very intriguing diagnostic problems because the recognition of the cause of such a dermatitis is found by process of elimination. It is a problem of detection and presents an ideal occasion on which to use the patch test as a means of demonstrating the cause of the dermatitis. In an individual suspected of being sensitive to a cosmetic preparation, apply the product to the skin under adhesive tape, leave it there for forty-eight hours or thereabouts, and then read the reaction. If the test is positive, a patch of dermatitis will have been produced. The difficulty in this type of investigative procedure is to know the ingredients in the cosmetic. For example, more recently, since orris root has been discontinued as the basis for so many powders, the manufacturers are now using an earthen substance known as tremolite, and many people continue to have an irritative dermatitis from the spicules or needles contained in the tremolite. Rice and wheat may be the basis for powder, and many individuals are sensitive to these, manifested either in a dermatitis or asthma or hay fever-like attacks. Hence the need for knowing the ingredients in the cosmetic.

Many perfumes and toilet waters contain oil of bergamot, especially the more expensive perfumes. The oil of bergamot is a light sensitizer, and when patients apply such a perfume to the skin and expose themselves to the sun, a burn is produced at the site of application. The dye in rouge and lipstick, especially carmine, will irritate some skins. The majority of manufacturers endeavor to produce products that do not produce dermatitis, for quite obvious reasons. There is no method of desensitization which can be used in persons found to be susceptible to the various ingredients in cosmetics, and to avoid further difficulty it is essential that they discontinue the use of the irritating preparation.

I have a patient with endometriosis of the rectovaginal septum. Do you recommend radium or surgery? The mass is about the size of an English walnut and is very painful when she menstruates.

DR. J. C. MASSON, Rochester, Minnesota: The term "endometriosis of the rectovaginal septum" is another name for the well recognized condition of adenomyoma of the rectovaginal septum. The treatment of this condition is one of the real problems in gynecology. The etiology is not entirely settled and the probability is that many of the tumors which are included under this name have an entirely different origin. If a patient has a tumor in the rectovaginal septum and no other indications of endometriosis and it is possible to remove it either through the vagina or through the abdomen without opening into the rectum, this is advisable but if it is necessary to resect the large bowel to accomplish complete removal, in the majority of cases, except in very young women, it would be advisable to remove both ovaries as this will prevent any further growth of the adenomyoma.

Radium locally has very little, if any, effect on an adenomyoma. Any good accomplished by the use of irradiation is due to its effect on the ovaries and not on the local growth. In the great majority of cases in which there is extensive involvement of the rectovaginal septum, there are other endometrial growths or implants scattered throughout the pelvis, necessitating more radical surgery. If a woman is close to the menopause, castration with radium or x-ray is quite justifiable unless large tumors, especially chocolate cysts of the ovary, are present.

How reliable are the retinal changes in the diagnosis of malignant hypertension?

DR. W. L. BENEDICT, Rochester, Minnesota: Retinal signs of malignant hypertension are progressive narrowing of the retinal arteries with resulting edema of the retina and the choroid and swelling of the optic disk.

To those who are perfectly familiar with changes of the fundus as revealed by the ophthalmoscope, there is very little difficulty in judging the extent of these changes, so they become thoroughly reliable indices of malignant hypertension. In its gross picture, the retinitis of hypertension is similar to that of choked disk with secondary changes, particularly if it occurs in people who have a moderate degree of arteriosclerosis. The picture is complicated by inadequate renal function with edema of the retina, hemorrhages, and exudates. It is only when swelling of the disk occurs in the later stages that one can be sure he is dealing with malignant hypertension.

With physical findings and a history of long continued or very rapidly progressive hypertension, the retinal diagnosis is most reliable.

What practical suggestions have you to offer in making an early diagnosis of carcinoma of the stomach? I have recently had two patients whom I called negative and later on both were found to have carcinoma.

DR. J. D. CAMP, Rochester, Minnesota: The early roentgenologic diagnosis of any lesion of the stomach presupposes a thorough familiarity with the normal. In the hands of the average physician, a careful fluoroscopic examination plus several films in various positions will give the most reliable results. The eyes should be fully accommodated before fluoroscopy is attempted. All patients' stomachs should be empty and a barium meal of good homogeneous density should be used. The gastric mucosa is best observed by the use of small

amounts of barium carefully manipulated about the stomach by the palpating hand.

In my experience, the most valuable sign of ulcerating carcinoma is the "meniscus" sign, described by Carman. The "meniscus," which represents the crater of the growth, varies in size with the lesion, but its characteristic roentgenoscopic appearance has allowed the recognition of carcinomas as small as 1.5 cm. in diameter. Polypoid lesions, particularly discrete polypi, regardless of their size, may exhibit microscopic evidence of malignancy, hence this possibility should be borne in mind in spite of the fact that the roentgenologic evidence grossly indicates a benign lesion. Not infrequently small lesions will be missed because the stomach is filled with too much of the barium meal, which interferes with proper palpation and visualization of the gastric mucosa. The recumbent position must be used for the examination of the cardia.

Are the ordinary arch supports sold in shoe stores of any value in the treatment of flat foot?

DR. HENRY W. MEYERDING, Rochester, Minnesota: Many people wear arch supports who do not need them. It is not a question where they are sold, but whether they are needed and well fitted.

The usual condition found is a weak foot, not a flat foot. The condition is the result of nonuse, sedentary life, overweight, and probably is aggravated by improper shoes. The way to correct this type of foot is by exercise, the avoidance of stress and strain, which occurs among shop girls who stand on their feet for a long time and among men who stand at ease for long periods of time. Tendons and ligaments become stretched. The muscles are weak, do not have good tone and become relaxed. The bones are unable to support the weight of the body normally and become displaced. These patients do not require arch supports. What they require is a system of graduated exercise that will build up those muscles which tend to give support. This will allow them to walk in comfortable well fitted shoes.

The promiscuous use of arch supports, sold without proper supervision, is to be condemned.

In an operation for ectopic pregnancy I recently encountered a large amount of blood in the peritoneal cavity. I emptied out the blood and gave the patient a transfusion. I have since been informed that I could have used this blood for transfusion. Is this advisable?

DR. R. D. MUSSEY, Rochester, Minnesota: The doctor who asked this question is quite right in using the blood from a donor for transfusion, although it is possible to use blood from the peritoneal cavity or from the chest cavity. As you know, recently in Pittsburgh, according to the news headlines, blood from the chest cavity was used in a case of puncture wound of the heart. As a rule, however, it is better to use a matched donor if the matched donor can be obtainer at the time that the blood is needed. However, in an emergency, one may use other solutions for transfusion. One that has been of distinct value to us in emergencies is a 6 per cent gum acacia in double distilled water. Its value rests particularly in the fact that it remains in the vessels longer than either saline or glucose and maintains a volume of blood until such time as a donor can be obtained, if a blood transfusion later becomes necessary.

If the blood in the abdominal cavity is used, one has to be sure that it is all carefully filtered. Unless one meets with such an emergency that no other fluid is available, ordinarily it would be better to resort to other solutions than using intra-abdominal blood.

The Volta Bureau

"We consulted several specialists, and all of them confirmed our fears, but none offered any solution of our problem." Thus the mother of a small deaf child wrote to the Volta Bureau. The sentence might be quoted verbatim from many letters written by parents of deaf or hard of hearing children, or by hard of hearing adults.

The knowledge that deafness is present and that it is incurable comes with the force of a major calamity. It is so crushing in its effect that something positive in the way of help must be offered immediately, if the individual is not to spend desperate years in a bewildered effort to adjust himself. The parents of a deaf child must be told that the child can be taught to speak and can be successfully educated, and that this education may be begun at home immediately, even if the child is not more than two years old. The parents of a child whose hearing is only slightly impaired must be given advice as to his adjustment. The hard of hearing adult must be told about lip reading, about hearing aids, about social efforts in his behalf.

The Volta Bureau was established for the purpose of furnishing all this information to all who ask for it. Its services are free. Alexander Graham Bell, the son of a hard of hearing mother, the husband of a deaf wife, the lifelong friend of everyone handicapped by deafness, used the money received as a prize for inventing the telephone to found the Volta Bureau so that anyone confronting the problems of deafness might be assured of help. Advice is given as to schools and preschool training, lip reading instruction, hearing aids, social contacts, psychological difficulties. While the Volta Bureau is not equipped to do employment service, it gives information in regard to the fields of activity that are open to the deaf and the hard of hearing.

The Volta Review, a magazine for parents and teachers of the deaf and for the hard of hearing, is on the reading table of many physicians. Pamphlets dealing with all phases of deafness except medical problems are available to all who ask for them. Lists of such pamphlets and sample copies of the magazine will gladly be sent free of charge. The Volta Bureau is located at 1537 35th St., N.W., Washington, D. C.

CLINICAL PATHOLOGICAL SEMINAR*

Conducted by E. T. BELL, M.D.

Department of Pathology, University of Minnesota

Minneapolis

Chronic Lipoid Nephrosis of Mixed Type

Case 21.—The case is that of a man, sixty-four years old, a newspaper linotype operator, who was admitted to hospital January 2, 1936, complaining that he had injured the right upper arm the day before; he did not know how it happened. His physician had found him in a convulsive state and sent him to the hospital. The patient had had "heart and kidney trouble" for the preceding ten years.

The temperature on admission was 98.6°, pulse 80, respirations 18 and blood pressure 90/60. He was slightly disoriented. In the bases of both lungs there were a few scattered crepitant and bubbling râles. There was a fracture of the right arm 10 cm. above the elbow with lateral displacement of tissues. Examination otherwise essentially negative. The impression from the x-ray plates was fracture of the distal third of the shaft of the right humerus, questionably pathologic. The urine showed albumin +++; specific gravity 1016; no pus cells; no red blood cells. Blood: hemoglobin 70 per cent; leukocytes 32,750. Wassermann and Kahn tests were not done.

On the day of admission a Kirschmer wire was inserted through the olecranon process of the right ulna. He got along well until the third day following admission when at 7 a. m. he suddenly became cyanotic and his respirations became labored. He became stuporous and comatose and died at 9 a. m. the same day.

After the autopsy it was found that for about ten years the patient had been studied in various institutions with special regard to kidney disease. In June, 1926, during a period of four weeks he had severe generalized anasarca. He was treated by paracentesis. thoracentesis, skin punctures and special diets whereby the excessive body fluids were greatly reduced. The urine at this time contained 7.6 gm. of protein per twenty-four-hour specimen and many casts. The nonprotein nitrogen was 35 mg. In the previous history there was no sore throat nor any febrile or infectious illness preceding the edema.

On April 29, 1927, he was admitted to hospital because of edema and albuminuria. He complained that for a time he had suffered from diplopia. The blood pressure on admission was 172/112; this was shortly checked and found to be 146/104. During the rest of the stay in hospital the blood pressure was never over 145 systolic, usually between 110 and 130. The eyegrounds were normal. X-ray of the heart showed normal size and contour; x-ray of the chest showed evidence of fibroid tuberculosis in the right upper lobe. The urine contained constantly 2 to 6 gm., of albumin per twenty-four-hour specimen. Daily specimens were almost constantly recorded as +++ to ++++ albumin; there were many casts; white cells were frequently found and usually a few red blood cells; the specific gravity ranged around 1021. Blood: hemoglobin 65 per cent; red cells 3,600,000; leukocytes 12,000 to 15,000. The P. S. P. varied between 23 per cent and 34 per cent in two hours. The blood urea nitrogen was between 22 and 26 mg. per 100 c.c.

He was treated by the usual methods to reduce edema. Dental work was done with extractions because of pyorrhea. He was much improved and was followed thereafter at the dispensary; he first reported here in October, 1927, and his last visit was in January, 1931. During this period his blood pressure was usually about 140 systolic; one reading was 152/96. The edema greatly improved although the urine continued to show +++ to ++++ albumin. The blood urea nitrogen was 27 mg; the P. S. P. was 35 per cent.

He was next seen at the hospital where he was admitted on the medical service in March, 1934. For about three months he had been growing weaker, had lost weight and suffered from vomiting. In addition there had been sudden attacks of dyspnea. He was pale and anemic; his skin was dry and scaly. There was impaired resonance with diminished breath sounds over the right lower thorax. There was slight pitting edema of the feet and ankles. Otherwise the physical examination was essentially negative. The blood pressure was 124/85. X-ray showed a normal appearing heart shadow. The electrocardiogram was normal.

The urine constantly contained +++ to ++++ albumin; casts were always present; occasional red cells were usually found and pus cells varied between 14 and 250 per high power field. Quantitative determinations showed excretion of 0.5 gm. to 8 gm. per twenty-four hours; as a rule 2 to 5 gm. were excreted daily. Three different P. S. P. tests showed excretions of 8 per cent, 4 per cent and 9 per cent in two hours. The blood urea nitrogen varied between 22 and 30 mg. per 100 c.c. The plasma protein determination showed fibrinogen 0.51 per cent, globulin 2.52 per cent, albumin 2.09 per cent, total 5.12 per cent. In a special concentration and dilution test the specific gravity of the urine varied between 1002 and 1014. There was rather severe secondary anemia with 50 per cent hemoglobin and 2,800,000 red cells. The anemia gradually improved under treatment and at the time of discharge the hemoglobin was 70 per cent. There was almost constant leukocytosis with counts between 17,000 and 21,000.

The patient improved considerably under treatment. The edema completely left him. Albuminuria persisted. A persistent diarrhea was treated with paregoric. He was discharged on April 21, 1934, on a salt free, low protein diet. He was taking reduced iron for his anemia.

He was seen several times in the dispensary between May, 1934, and September, 1935. The blood pressure tended to be regularly more elevated with systolic levels of 130, 170, 180, 160 and 170. The urine contained ++ to ++++ albumin, occasional or two to three red blood cells, numerous pus cells and many casts. The secondary anemia continued to improve. Four blood urea nitrogen determinations during this period were 35, 42, 27 and 40 mg. per 100 c.c.

Autopsy findings: The heart weighs 260 grams; it shows no disease except some coronary sclerosis. There is chronic tuberculosis of the upper lobe of the left lung. The right kidney weighs 100 grams, the left 90 grams; the surfaces are finely granular. Microscopic section of the kidneys shows marked cortical atrophy and large numbers of hyaline glomeruli; the persistent glomeruli show marked thickening of the capillary basement membranes.

Diagnosis: Chronic lipoid nephrosis of the mixed type.

Comment.—This disease was formerly called "chronic parenchymatous nephritis." It is characterized through-

out its course by marked albuminuria and edema with only moderate hypertension. Renal insufficiency comes on later in the course of the disease. The microscopic change is thickening of the capillary basement membranes which continues until a large part of the glomerular circulation is closed. This results in atrophy of the kidneys. The majority of cases of lipoid nephrosis of mixed type show larger kidneys than these at postmortem. Occasionally the kidneys are contracted as in this instance. In pure lipoid nephrosis there is no hypertension or renal insufficiency but these features are present in the mixed type.

Carcinoma of the Stomach with Meningeal Metastases

Case 22.—The case is that of a woman, fifty-eight years old, who was first seen by her physician in 1925 when she complained of gastric distress. Diagnosis was made of peptic ulcer and she was treated medically with relief. In 1934 she had tarry stools. In 1932 she had diplopia which was corrected by refraction. She was otherwise fairly well until about May 23, 1936, when she began to have projectile vomiting and vertigo. On about June 1 she was admitted to hospital with the complaint of gastric distress. While there she had headache, visual disturbances and severe pain in the scapular region which radiated to the top of the head. There was rigidity of the neck. Gastrointestinal x-ray study showed a healed peptic ulcer. She returned home after two weeks of hospital stay.

On June 19 she was admitted to another hospital; headache, vomiting and rigidity of the neck had persisted; there was no fever on admission. Neurologic examination was entirely negative except for rigidity of the neck and the absence of the plantar response on both sides. Spinal puncture on June 20 showed the fluid under presure of 42 mm. of mercury; it was clear. The jugular pressure was normal. Cell count was 45 per cubic millimeter; the cells were very large mononuclear cells which were interpreted as endothelial cells. The pain decreased after the withdrawal of spinal fluid. No physical examination recorded.

Laboratory findings: Hemoglobin 52 per cent to 55 per cent; red blood cells 3,250,000; white cells 14,400; 80 per cent polymorphonuclears, 2.5 per cent young forms; lymphocytes 18.5 per cent; monocytes 0.5 per cent; transitional monocytes 0.5 per cent. The polymorphonuclears showed a definite shift to the right with many lobes and a few of them suggestive of pernicious anemia. There were no macrocytes. The urine was not examined. X-ray studies showed fairly extensive hypertrophic arthritis involving the lower cervical vertebræ; no evidence of fracture, dislocation or bony injury. The skull was negative. Blood pressure 120/70 to 140/78; pulse 80 to 90 until the ninth day after admission when it began to rise; respirations 20 to 30.

On June 23, three days following the spinal puncture, the patient again experienced projectile vomiting. On June 26 she complained that she was unable to see. The vomiting persisted. She was given morphin for the pain and intravenous glucose. The temperature began to rise the fifth day after admission and reached 101.6° axillary at death; the pulse rose to 140; the patient was comatose during the last few days of life. Death occurred July 2, 1936.

Postmortem: The body was well nourished; there was no edema or jaundice. The right pleural cavity was obliterated by old adhesions. The heart, lungs, spleen and liver were normal. The stomach showed a large ulcer on the posterior wall at the lesser curvature near the pylorus, measuring 4x4x5 cm.; the edges were indurated and the crater was deep; there was a second similar ulcer close to the pylorus. The wall of the stomach underlying the ulcers was indurated. Microscopic section showed the ulcers to be scirrhous carcinoma. Both ureters were moderately dilated but no obstruction was found. The meninges appeared on gross section to be normal; no increase of subarachnoid fluid; no tumor was found in the brain on section; there was definite flattening of the convolutions. The spinal cord was removed and also appeared normal on gross examination.

Microscopic sections of the meninges of both brain and spinal cord in several places showed the subarachnoid space filled with tumor cells; the cells were rounded and free, resembled lymphocytes to some extent but all of them contained mucin and resembled the cells in the carcinoma of the stomach. There were also metastases in the lymphnodes and adrenals but these contained solid masses of carcinoma such as one ordinarily sees.

Diagnosis: Carcinoma of the stomach with widespread metastases to the subarachnoid space; also to the lymphnodes and adrenals.

Comment.—This is a rare type of metastasis from a carcinoma of the stomach but several such cases have been published. It is to be noted that the x-ray was misinterpreted as a benign ulcer. It is likely that the carcinoma had been present since 1925. Scirrhous carcinomas of long duration occur frequently. There is no convincing evidence that the original lesion was a benign ulcer which later became malignant. The irritation of the subarachnoid metastases gave the picture of meningitis. Possibly the tumor cells might have been recognized in the spinal fluid if the pathologist had had this possibility in mind.

Carcinoma of the Liver (Hepatoma)

Case 23.—The case is that of a man, sixty years old, who twenty-seven years ago had had removal of left undescended testicle and herniotomy. He was first seen by his physician concerning his present illness on March 18, 1935. Six years before he had been seen by the same doctor when he had an irritable colon and infected tonsils. In the interim his weight had increased from 128 pounds to 161 pounds.

In March, 1935, his complaint was constipation for four weeks and loss of 15 pounds in weight in six months, his weight then being 146 pounds. Examination showed a hard liver edge; blood pressure 148/80; rectal examination negative; cholecystography and liver function test (bromsulphthalein) normal; sedimentation rate 19 mm. in one hour by the Cutler method; quantitative van den Bergh 0.6 unit; hemoglobin 90 per cent. Urinalysis and Kahn test negative.

On May 27 he was seen again; there had been no improvement; his weight had dropped 10 pounds, being now 136 pounds; an irregular mass was felt in the region of the gallbladder on standing. Hemoglobin was still 90 per cent; quantitative van den Bergh showed only a faint trace of bilirubin in the blood.

On July 20 he left for a two weeks' vacation in the north woods; during this time he felt much improved. His weight was now 130 pounds. On August 13 he went to a clinic where he was given a very thorough examination. They also found a firm, fairly regular, nonfixed, nonsensitive mass in the right upper quadrant; the liver edge was two fingers below the costal margin on inspiration. Cholecystography and liver function test were normal. A few small diverticula were found in the colon. The patient was seen by a surgeon who advised against operation and thought the condition

was either cirrhosis or localized enlargement of the liver caused by disease of the gallbladder.

In October he was again seen at the same clinic; no definite diagnosis could yet be made by them. He again saw his first physician who noted that the liver was more enlarged than on previous visits; seven pounds more loss of weight; sedimentation rate 23 as compared to 19 in March. Impression now was upper abdominal malignancy. Hemoglobin 85 per cent. Urinalysis still negative.

In the middle of December the patient was at a veterans' hospital where diagnosis was made of inoperable carcinoma of the stomach with metastases to the liver. His physician now advised another check on the patient and gastrointestinal x-rays were interpreted by the roentgenologist as showing no malignancy. This was in the middle of January, 1936.

On February 14 the patient was operated upon but the surgeon did not find any growth in the stomach. The liver, however, was full of tumor masses. The patient's course from that time was progressively down hill. There was no jaundice at any time. Death occurred April 7, 1936.

Postmortem examination: Marked emaciation; no jaundice; decubital ulcers over the sacrum and over the heels. The surgical incision was well healed. The peritoneal cavity contained about 100 c.c. of slightly blood-tinged fluid. The liver edge reached 2 cm. below the costal margin in the right mid-clavicular line; the liver was adherent anteriorly to the diaphragm. The heart weighed 175 grams and showed no disease. The right lung weighed 275 grams, the left 375 grams; about fifty small tumor nodules in the right lung and about twenty-five in the left; these ranged from 2 mm. to 1 cm. in diameter, were firm and of whitish color. The bronchi and pulmonary arteries were normal; no pneumonia. The spleen weighed 485 grams and showed chronic passive congestion.

The liver weighed 2700 grams. In the central part of the right lobe was a large tumor which occupied about one-third of the surface of the cross section; the tumor did not involve the gall bladder. All other parts of the liver were filled diffusely with round tumor nodules, ranging up to 4 cm. in diameter. In the hilus of the liver were two large lymphnodes filled with tumor. The bile ducts were not obstructed at any point. The stomach showed no disease. The other organs showed no significant lesions.

Microscopic examination showed the tumor to be a hepatoma (this is primary carcinoma of the liver in which the cells are differentiated to such an extent that their origin may be recognized).

Diagnosis: Primary carcinoma of the liver (hepatoma) with metastases to the lungs and regional lymphnodes.

Comment.—This is a fairly typical clinical history of primary carcinoma of the liver except that in most instances jaundice develops. The diagnosis may usually be made by the microscopic structure of the tumor. A thorough postmortem examination, excluding all primary growths outside of the liver, is very helpful in cases where the histologic picture is not convincing. It frequently happens that recognition of masses in the liver leads to a false diagnosis of carcinoma of the stomach.

Organizing Lobar Pneumonia

Case 24.—A man, aged 54, was admitted to the hospital on March 31. Two months previous to admission he had had a severe cough with moderately severe pain over his entire chest. During the two weeks previous to admission these symptoms had become much more marked and were associated with a high fever. At the onset of the illness he coughed up large quantities of foul sputum, which gradually decreased in quantity. Weakness had increased and there was moderate loss of appetite. The past history was essentially negative.

The temperature was 104.6°, pulse 156, respirations 36; blood pressure 110/50. The patient had moderate difficulty in breathing and was quite cyanotic. The breath had a foul odor. Dullness was moderate over the lower half of the right chest. Bronchial breathing was heard over the right chest posteriorly. There was a marked friction rub anteriorly and numerous coarse râles were heard. The heart rate was so rapid that it was difficult to hear the heart tones. The left side of the chest was normal.

Urinalysis showed a trace of albumin; 6 to 8 pus cells; a few hyaline casts; many granular casts. The hemoglobin was 64 per cent and leukocytes 17,300. Examination of the sputum showed occasional pneumococci; it was negative for tubercle bacilli; occult blood and pus were present. X-ray examination of the chest revealed increased density in the middle and lower lobes of the right lung. The exact nature of the process could not be determined.

The patient complained of constant pain in his chest. He had a very severe cough but raised only a very little foul purulent sputum. Thoracentesis was done the day of admission but only 2 c.c. of thick green pus was obtained, possibly because of plugging of the needle. The patient was very restless at all times and perspired profusely. The respirations gradually became more shallow, irregular and rapid. He developed a deep cyanosis. The pulse became weak and thready. He expired on April 2, three days after admission.

Autopsy findings: Right empyema of 300 c.c. of purulent fluid; numerous fibrous adhesions in this cavity. The right lung weighed 1760 grams (five times the normal). There was complete consolidation of the entire lower lobe. Several abscesses, approximately 2 cm. in diameter, were seen on the anterior surface of the lower lobe. On section the lower lobe had a gray fleshy appearance. In it were found numerous abscesses ranging from 1 to 3 cm. in diameter. Palpation of this surface revealed areas of rubbery consistence between the soft necrotic abscess areas. The left lung weighed 550 grams; crepitation was diminished in the posterior portions of both lobes. On section the surface appeared somewhat fleshy and mottled. Large amounts of fluid and small arounts of pus could be expressed from the cut surface.

The liver was large and fatty. The kidneys were very large and cloudy.

Microscopic examination of the lungs showed lobar pneumonia in early organization with many abscesses.

Bacteriologic study: Smear of lung abscess showed Gram positive diplococci. Gram negative filaments and many fusiform bacilli. From the lung culture were isolated Staphylococcus aureus, Streptococcus viridans, fusiform bacilli and diphtheroids. Culture of the spleen was negative.

Diagnosis: (1) Organizing lobar pneumonia; (2) multiple abscesses of the lung; (3) fatty metamorphosis of the liver; (4) empyema of the thorax.

Comment.—This case illustrates one of the complications of pneumonia. From the clinical standpoint it might well have been considered a carcinoma. The exact onset of the consolidation is neither obvious nor were the symptoms typical of lobar pneumonia. When a pneumonia fails to undergo resolution and the exudate organizes, abscesses are usually present. In the long standing process with much proliferation of connective tissue the appearance of the lung has given rise to the name of carnification.

EDITORIAL

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The American Board of Internal Medicine

THE announcement in the *Journal of the American Medical Association* for August 1, which appears somewhat abbreviated in this issue of MINNESOTA MEDICINE, of the final steps in the movement for certification of specialists in internal medicine is of historic significance. The Regents of the American College of Physicians at the Philadelphia session in 1935 adopted a resolution to underwrite the necessary expense and join with the Section on Practice of Medicine of the American Medical Association in the organization of this board in the United States and Canada. The work has been well and promptly done.

The membership of the board consists of five representatives from the American College of Physicians: J. C. Meakins, O. H. Perry Pepper, David P. Barr, W. S. Middleton and G. Gill Richards; and four members representing the Section on Practice of Medicine: Reginald Fitz, Ernest E. Irons, John H. Musser and Walter L. Bierring. The character of these men and their interest in the progress of medicine in general assure wise action in the public interest.

The purpose of the board is the certification of specialists in internal medicine and the establishment of proper qualifications, together with the required examination procedure, for certification. Great significance lies in the fact that establishment of this board should now prevent the establishment of boards for the narrower fields in internal medicine. Since the first board of certification, that in the narrow field of ophthalmology, began its work in 1916, many boards have been built up to function in surgical fields, as it has seemed legitimate and practical that anatomical divisions should play some part in surgical specialization. In internal medicine, however, the need is for breadth of view and completeness of understanding of the entire body and its functions. No anatomical division or functional group of organs can be separated from the patient as a whole. It is for this reason that internal medicine, as represented in the American College of Physicians and many other national organizations, has striven to keep internal medicine and its subsidiary specialties on a broad foundation. Immediately after July 1, 1937, this board will inaugurate similar qualifications and procedures for additional certification in some of the more specialized branches of internal medicine, such as gastroenterology, cardiology, allergy, metabolic diseases and tuberculosis; but certification in the broad field of internal medicine will be required first. The operation of this plan will doubtless require the participation and coöperation of representatives from each of these narrower fields in medicine.

It is well to remember that the purpose of the board is not primarily that of certification of competence in these fields, but of certification of men qualified as specialists and consultants. This is in line with the movement that has obtained such impetus in the American Medical Association for the reëstablishment and promo-

tion of the interests of the general practitioner. In the past the American Medical Association directory has indicated interest in, or limitation to, a special field solely on the announcement of the individual involved, but when boards covering all specialties have been in full operation, the announcement of specialization in the directory will depend on proper certification. This should result in better understanding by the profession and the public. This movement should, when completed, prevent the assumption of the title of specialist, at least under recognized auspices, by anyone who desires the listing. The movement for certification in internal medicine, under the fostering care of the Advisory Board of Medical Specialties and the Council of Medical Education and Hospitals of the American Medical Association, marks a long step in advance in medical organization.

S. MARX WHITE.

Inter-State Postgraduate Assembly

ARRANGEMENTS are under way for the International Medical Assembly of the Inter-State Postgraduate Medical Association of North America which will meet in Saint Paul, October 12-16, 1936, the complete program of which appears elsewhere in this issue.

This year's Assembly will be the twenty-first annual meeting of the organization, which began as a confederation of county medical societies of northern Illinois, southern Wisconsin and eastern Iowa in 1916. At its first meeting the name of the organization was changed to the Tri-State District Medical Society of Illinois, Iowa and Wisconsin. In 1919 the growth of the society was such as to warrant the substitution of the term Association instead of Society. In 1925, under the direction of Dr. W. B. Peck of Freeport, Illinois, who has been the moving spirit of the organization for twenty-one years, a tour of medical clinics in Canada, the British Isles and France was conducted for some 753 American physicians and their wives. At the meeting held in Saint Paul in 1925 the term International Assembly was first used and the proceedings of the meetings were first published. In 1930, under the presidency of Dr. William D. Haggard, the Assembly met in Minneapolis. Last year the meeting was held in Detroit, with Dr. Charles H. Mayo as president. The largest registration was that in Detroit in 1929, when 5,800 physicians were in attendance.

In glancing over the program we see a goodly representation of Minnesotans: Drs. Litzenberg and Wangensteen of Minneapolis; Drs. Adson, Allen, Balfour, Cabot, Lundy, William H. Mayo, Walters and Wilder of Rochester; Drs. Crothers, Schlutz and Rowntree, former Minnesota residents; and Drs. Earl Bond and John Fulton, both born in Saint Paul, but having acquired medical distinction in the East. Although attendance at the Assembly and its exhibits is limited to physicians, certain provision is being made for the entertainment of the wives of physicians by the Ladies Auxiliary of the Ramsey County Medical Society, which society is acting as host at the coming meeting. The wives and friends of physicians in attendance are invited to attend the Assembly dinner on Wednesday evening.

Osler's One Volume

THE question has already arisen as to the advisability of someone's continuing the periodic revision of Osler's one volume entitled "The Principles and Practice of Medicine."

The original volume which appeared in 1892 embodying as it did the knowledge and experience of the outstanding medical man of his time was hailed with enthusiasm by members of the profession and was translated into many foreign languages, including Chinese. The eighth edition, which was the last edition that Osler had anything to do with appeared in 1920 after Osler's death and, as he had written in the preface, bore little resemblance to the first edition due to the "extraordinary growth of our knowledge, particularly in the department of the infectious diseases."

The following four revisions of the volume were gotten out by Thomas McCrae, an outstanding medical man and one who, through his association with Osler, was in a peculiar position to carry out the original purpose of the work. Strangely this twelfth and last edition dated 1935 appeared also after the author's death.

A very fair review of the twelfth edition of Osler's text appeared in the *Bulletin of the Johns*

Hopkins Hospital for June of this year. It is not surprising that praise of the last edition and of both Osler and McCrae is mixed with the expression of some difference of opinion on the treatment of certain subjects in the volume. A book review worth while would not be expected to be in full accord with every statement of the author, particularly when the subject covers such a broad field. The reviewer thinks that a volume by one outstanding man has certain advantages over one in which each subject is treated by one individual. With this we agree and the problem for the future seems to lie in finding a man with Osler's and McCrae's outstanding ability to continue the volume.

Without any doubt Osler's volume has been the most valuable single volume on medical diseases to the general practitioner, internist and also the surgeon. How often one has thought he has found something new in medicine and has sought elsewhere in vain for information on the subject only to find the sought for material in this volume of Osler. With such a mass of medical material appearing each year and so much of an ephemeral nature, it does seem as though the continuation of Osler's volume will meet with the approval of the profession at large.

Refined and Concentrated Antipneumococcic Serum Type VII-Lederle

The Council on Pharmacy and Chemistry reports that the Lederle Laboratories, Inc., presented Refined and Concentrated Antipneumococcic Serum Type VII (Lederle) for consideration by the Council. It is claimed to be useful in the treatment of pneumococcic pneumonias of this type, which is one of the twenty-nine groups of pneumococci previously considered to be group IV organisms. The identification of these individual types and the clinical use of the specific serums have been carried out under the direction of Park by his associates Cooper and Bullowa. In Bullowa's series of 1,000 cases, about 7 per cent were found to be due to type VII organisms. The firm did not submit any bibliography for the preparation. The Council agrees with Cooper that the results are encouraging, and to a lesser extent with the firm's statement that the results are suggestive of a definite therapeutic effect. It is pointed out, however, that comparative percentages based on such a small series may be entirely misleading. In view of these factors, the Council postponed consideration of this antiserum until these workers, or others, have extended the use of this agent to a larger series of cases, and authorized publication of the foregoing preliminary report.—(J. A. M. A., May 2, 1936, p. 1564.)

In Memoriam

Seymour R. Lee

1899-1936

DR. SEYMOUR R. Lee, superintendent of the Ancker Hospital, Saint Paul, since December 1, 1935, died at the hospital August 10, 1936, from complications following an appendectomy performed July 30.

Dr. Lee was born in Blooming Prairie, Minnesota, October 20, 1899. At the age of ten his family moved to Howard, South Dakota.

In 1926 Dr. Lee obtained his degree from the medical school of the University of Illinois where he was a member of the Alpha Kappa Kappa and Sigma Alpha Epsilon medical societies. He served as interne and house physician at the Ancker Hospital in 1927 and 1928 and became resident physician in charge of obstetrics from July 1928 to October 1929, when he was made assistant superintendent. In this capacity he served until 1934. In 1934 Dr. Lee was made superintendent of the Hastings State Hospital and a year later was put in charge of the Willmar State Hospital where he remained until last December.

Dr. Lee was a member of the Saint Paul Athletic Club, the American College of Hospital Administrators, a director of the Minnesota Hospital Association, and was also editor of the Association's publication "Minnesota Hospitals."

Dr. Lee married Elsie Davidson of Garder, North Dakota, who with their five year old daughter, Dorothy, survives him. His parents, the Reverend and Mrs. Neil Lee, a sister Edna Lee of Minneapolis and a brother, Rev. Elwyn Lee of Topeka, Kansas, also survive him.

Dr. Lee became superintendent of the Ancker Hospital at the age of thirty-six and was one of the youngest of the large hospital administrators in the country. His industry and ability as well as his sterling character commanded the respect of the medical staff as well as his many friends outside the profession. His youth made his early departure sadder.

Richard Olding Beard

1856-1936

DR. RICHARD Olding Beard, a resident of Minneapolis since 1882 and active in the founding of the University of Minnesota Medical School, died August 14, 1936 at the age of seventy-nine. A detailed record of his life will appear in the October number of MINNESOTA MEDICINE.

MEDICAL ECONOMICS

Edited by the Committee on Medical Economics
of the
Minnesota State Medical Association

B. J. Branton, M. D.
L. H. Rutledge, M. D.
W. F. Braasch, M. D., Chairman
J. C. Michael, M. D.
A. N. Collins, M. D.

Your Standing Orders

Now is the time to consult your State Representative and your Senator. Ask him what his views are on all of the problems that concern Organized Medicine and the Public Health in Minnesota today.

THIS IS IMPORTANT. Do not neglect it.

For A Strong Public Health Association

Physicians of Minnesota are keenly interested in the welfare of the Minnesota Public Health Association.

Many outstanding members of the profession serve on its board of directors and on its executive committee. All of them have come to appreciate, within the last few years, especially, the wise administration of its tuberculosis program as well as its value, generally, to the public health of Minnesota.

Incidentally, they also value the benefits derived both by the public health association and the medical profession from the close affiliation that exists between the two organizations.

Through this affiliation, physicians have united wholeheartedly to give their time and assistance to public health association projects and to guide them into proper channels. The public health organization, on its side, having the inestimable benefit of the assistance and counsel of Organized Medicine, has thrown its resources and backing to the support of fundamental medical policies in Minnesota.

Well-Rounded Program

The result has been a well-rounded, well-planned public health program that has been conspicuous all over the country.

There is also the practical benefit of shared office space and equipment and shared personnel which has accrued to both organizations. Without this pooling of resources neither organization could afford to carry on its present extensive programs.

Central Leadership Essential

Physicians, then, see clearly the necessity for the present strong central organization of the Minnesota Public Health Association and its preservation on its present basis. They realize, also, the extreme inadvisability of supplanting such an organization by several independent local organizations, all supported by Christmas Seals but working at cross purposes and without reference to the programs of fellow organizations.

The present position of strength and central leadership of the Minnesota State Medical Association is a case in point. If the big city medical societies were to separate from the central state organization the effectiveness of all would be seriously limited. Central direction is certainly just as important for a public health program as for a medical organization—particularly when that health program has for its foremost objective the control of tuberculosis in Minnesota.

For Proper Support

Financial support for the activities of the Minnesota Public Health Association is derived from the sale of Christmas Seals. It is evident that a generous percentage must be centralized in a common fund if support is to be distributed where it is most needed throughout the state.

It is to be hoped that no local programs or committees will allow their individual ambitions, however praiseworthy, to stand in the way of support for this strong central organization.

Wausau Meeting

A significant and unusual medical conference was held in Wausau, Wisconsin, recently.

It was called and independently sponsored by the Employers Mutual Insurance Company. The program was devoted exclusively to traumatic surgery. There was no discussion of economics, no advertising.

Some 250 physicians from Minnesota, Wisconsin, Iowa, Nebraska and Illinois attended and all of them were enthusiastic about the program and entertainment which included, beside the two days of scientific program, a banquet at which Dr. Morris Fishbein gave one of his characteristic and very entertaining talks.

Practical Education

The entire conference was obviously well worthwhile. It appeared to meet a need that is not given sufficient attention through the customary channels of medical education. It was a practical conference on a subject which bulks large these days in medical practice. The speakers were well chosen and they handled their subjects with a view to giving their hearers practical assistance in their handling of injury cases.

The truth may be that medical schools are not instructing their students thoroughly enough on the surgery of accidents. Attempts have been made by medical and surgical societies to make up for this omission, but the attempts have been somewhat intermittent and ineffective. The reason may be that too many programs feature the speaker in a narrow field rather than the discussion of the everyday problems that confront the doctor.

Significant Departure

In any case, the enthusiasm shown by the men who attended this meeting should be of significance for both our schools and our societies.

There is another significance, too, which should not be overlooked by thoughtful medical men. This was a meeting of medical men called by a commercial organization, a new departure in post graduate medical education. There is no doubt that it was a well conducted meeting and that it met a definite need; but why were not our own medical organizations or our own Universities conducting this and similar conferences?

Are we slipping into academic ruts? If we are, then commercial organizations such as the insurance companies will be forced to take over important fields of education and the future of independent medicine is surely in danger.

Two Rulings on Old Age Assistance

The Honorable Harry H. Peterson, Attorney General of the State of Minnesota, has recently issued two rulings on Old Age Assistance that are of considerable importance to physicians.

In the first Mr. Peterson holds that a grant to a recipient of old age assistance may properly include items for medical, dental, surgical and nursing care, and also hospital assistance. The specific question being:

"May an Old Age Assistance grant properly include items for medical, dental, surgical or hospital assistance or nursing care?"

The response was:

"We answer this inquiry in the affirmative."

Right to Medical Assistance Affirmed

In the second ruling Mr. Peterson holds that the relief agencies in the various counties may grant medical, dental, surgical and nursing care, also hospital assistance, to a recipient of old age assistance even though such recipient is not receiving the maximum amount of assistance allowed under the Old Age Assistance Act. The specific question being:

"Some of the relief offices in the counties have raised the question of whether or not Section 5 (c) of the Minnesota Old Age Assistance Act gives them authority to grant relief for medical, dental, etc., care unless and until the Old Age Assistance Recipient is receiving the maximum amount of $30 per month.

"Hence, we should also like to have your ruling on the question of whether or not the relief agencies in the various counties may grant medical, dental, etc., care to a Recipient of Old Age Assistance when such Recipient is not receiving the maximum amount of Assistance allowed under the Old Age Assistance Act?"

The response to this question was also:

"We answer this question in the affirmative."

Every member of the medical profession should certainly familiarize himself with these two questions and the rulings of Mr. Peterson. These interpretations of the law make very clear the right of medical men and others to some reasonable compensation for services to the pensioner group.

Drouth Sequelae

Drouth relief in Minnesota will take the form of WPA employment for drouth victims.

Thus, in the thirty-five counties that had been accepted for federal drouth relief as this issue went to press, a total of approximately 25,000 persons were being added to WPA rolls. In fact, officials look for a larger WPA employment roll than at any time since its establishment in Minnesota.

Like other WPA workers, these drouth victims will receive a base pay of $48.40 a month for unskilled labor; and like other WPA workers they will not be eligible for direct relief or for any medical relief from the various county relief offices. It is possible, in the case of serious emergencies involving large amounts of money, that county commissioners may be persuaded to pay medical bills. In these cases, physicians should be warned to lose no time in making whatever arrangements may be necessary with county officials. For the payment of ordinary bills, however, complete responsibility rests with WPA clients, whether drouth victims or not, and the client himself is expected to make his own arrangements with the physician.

Officials Will Assist

Physicians will have all possible moral support from officials of the Works Progress Administration in making financial arrangements with these patients.

It is the expectation and desire of WPA officials that the workers shall pay ordinary medical bills, if not in full, at least in small monthly payments. Where the worker fails to make any attempt to pay, the doctor is requested to write Association Headquarters, 11 W. Summit Avenue, Saint Paul, so that WPA headquarters can be informed and pressure can be brought to bear upon the client to pay his bills.

The inadequacy of base rates of the WPA security wage, so far as medical care is concerned, has been pointed out frequently and frequently acknowledged by the WPA administration. Every effort will be made by Minnesota officials to alleviate the situation wherever possible and to secure some official adjustment in future regulations.

Following are the counties accepted to date for drouth relief:

Grant	Isanti	Wadena
Pope	Kanabec	Benton
Douglas	Kittson	Kandiyohi
Stevens	Lyon	Lincoln
Traverse	Marshall	Crow Wing
Swift	Mille Lacs	Hubbard
Big Stone	Morrison	Pine
Yellow Medicine	Norman	Aitkin
Wilkin	Otter Tail	Cass
Anoka	Sherburne	Chisago
Becker	Stearns	Ramsey
Clay	Todd	

Building Confidence

(A monthly editorial contributed by the Medico-Legal Advisory Committee)

The business world for several years has found itself in a state of chaos. Professional men have sensed this uneasy situation and have wondered which way the pendulum for the professions might be swinging.

There has been a change of religious feeling of the world, a sense of uncertainty, a lack of confidence, a breaking down of moral restraints; and, more to be regretted, a let down in the ethics of all professions due to the financial plight in which the men in these professions have found themselves.

But confidence, which the medical profession should never have lost, is now being gradually restored to us. We see the light through coöperative efforts. If we play the game well and honestly together, we need not worry about the future—the reward is ours in the work itself. If the "thrill" of the game is lacking, we may as well get out and make room for better players.

A physician's relation to the life of the community is one of most intimate character. Therefore, his reputation should be above reproach and his conduct unimpeachable. If he serves his clientele with integrity, gives his advice in terms of veracity and candor, he can afford to give his time unstintingly to the loyal, zealous care of the sick. There is work for all who wish that work. Perhaps the financial gains may not be so great as desired, but the satisfaction of work well done will be shown by happiness in the hearts and lives of those whom he has served unselfishly.

Your Medico-Legal Advisory Committee urges especially more consultations over difficult cases

during these times, and in order that the confidence of the patient in medical men may be furthered, that all envy and jealousy may be forgotten in the consultation discussion and that the benefit to be derived by the patient may be paramount. The Committee urges also that the consultant under no condition reënter the case unless so requested by the original attendant whose duty it is to make a frank statement to the patient or his family of the findings and conclusions of the consultation and the results expected.

Much of the feeling of distrust which is engendered by a long, continued, difficult case or through unwise words spoken by friends or relatives of the patient may be turned to renewed confidence by a consultation properly conducted. One more means of stopping malpractice litigation is accomplished thereby.

In Red and Black

"Who Wants Socialized Medicine?" asks an attractive little pamphlet printed in red and black ink and distributed by the Public Relations Committee of the Michigan State Medical Society.

Here is a little bit of printing that is as arresting and attention-catching as the Picture Books on Costs of Medical Care published several years ago by the Julius Rosenwald Fund.

Both are clever propaganda and if there was a place for one, there is certainly a need for the other.

The Michigan booklet lists in black arrows on the cover the people who do NOT want socialized or state medicine. They are the Public, the Patient, the Farmer, the Employed, the Taxpayer and the Physician. In startling red arrows appear the classes of persons who DO want it. They are listed as the Profit Seekers, the Paid Reformer, the Unscrupulous Politicians and the Philanthropists' Paid Agents. To these might be added some Misguided Theorists.

For Debaters

Inside the covers, succinct little statements appear about each of these classes of the population with figures and facts to back each assertion.

An interesting and valuable little book. It would have been welcomed eagerly by last year's high school debaters on state medicine. But the debate on state medicine is only in its early stage on a larger platform and before much larger audiences, all of whom would find it interesting. Copies can be secured from the Public Relations Committee of the Michigan State Medical Society, 2020 Olds Tower, Lansing, Michigan.

Minnesota State Board of Medical Examiners

Resolutions Adopted by Board

The following resolutions were adopted by the Board at a meeting held May 4, 1936.

RESOLVED: That the minimum general average permitted in order for candidates to obtain a license must be seventy-five per cent.

RESOLVED: That the candidates for license who fail to obtain the minimum mark in any two subjects upon which an examination is required shall be required to repeat the examination in those two subjects at the next regular examination without the payment of an additional fee.

RESOLVED: That the candidates for license who fail to obtain the minimum mark in any three subjects upon which an examination is required shall be required to repeat the entire examination in all subjects, and pay the regular fee required by law.

RESOLVED: That all former rules adopted by the Board inconsistent with these resolutions be hereby rescinded.

Complaint Filed Against Unlicensed Chiropractor at Windom, Minnesota

Re: State of Minnesota vs. Nitzke.

Following a report to the Minnesota State Board of Medical Examiners that one A. A. Nitzke was representing himself to the public as a chiropractor at Windom, Minnesota, an investigation was made. This investigation disclosed that Nitzke, who is not registered under the Basic Science Law in Minnesota, and who is not licensed to practice chiropractic in this State, was in charge of the chiropractic office of one M. E. Tegels. Tegels had left on a trip to be gone about six weeks and had placed Nitzke in charge of his office. When Nitzke was interviewed by Mr. Brist on behalf of the Board, Nitzke stated that he had a Basic Science Certificate and was licensed to practice chiropractic. The records, however, disclose otherwise. Evidence was obtained that during the week of July 6, 1936, Nitzke gave chiropractic treatments to a number of Dr. Tegel's patients. On July 14, 1936, a complaint was filed against Nitzke charging him with practicing healing without a Basic Science Certificate. Before the warrant could be served upon Nitzke he apparently left the State. The records disclose that Nitzke practices chiropractic at Storm Lake, Iowa. However, he has no authority whatever to practice in the State of Minnesota, and he will not be permitted to do so unless licensed. If he returns to this State at any time in the future, he will have to face the complaint that has been filed against him.

The Minnesota State Board of Medical Examiners respectfully requests that any one having any information indicating that Nitzke has returned to the State of Minnesota, get in touch with the Board at 524 Lowry Medical Arts Building, St. Paul.

OF GENERAL INTEREST

Dr. M. H. Nathanson left Minneapolis last month for Los Angeles, where he will continue the practice of internal medicine.

* * *

Dr. M. N. Moss of Saint Paul recently moved to Philadelphia, where he will continue the practice of obstetrics and gynecology.

* * *

Dr. Josephine Tofte has severed her connection with the Oak Hill Rest Home in St. Cloud, Minnesota, and is temporarily located in Minneapolis.

* * *

Dr. P. C. Pilon of Paynesville, Minnesota, has returned from Europe where he and Mrs. Pilon spent the summer visiting relatives of Mrs. Pilon.

* * *

The marriage of Miss Winifred Rita O'Reilly and Dr. Richard Peter Neary of Minneapolis will take place Saturday morning, September 5, in the Church of St. Anthony of Padua.

* * *

The practice of Dr. J. A. Roy of Red Lake Falls, who is ill, will be taken over for an indefinite period by Dr. L. S. Arling, a graduate of the University of Minnesota Medical School in 1934.

* * *

A committee of three psychiatrists, Dr. Henry A. Michael, Minneapolis, Dr. E. M. Hammes, and Dr. Gordon R. Kamman, Saint Paul, has been appointed to determine the mental status of prisoners at the State Penitentiary at Stillwater.

* * *

Dr. Thomas Broadie, acting superintendent of Ancker Hospital, Saint Paul, since the death of Dr. S. R. Lee, August 10, was appointed superintendent on August 24. Dr. Broadie received his medical degree at the University of Indiana and has been assistant superintendent since July 1931.

* * *

Dr. D. G. Mahle, a graduate of the University of Minnesota Medical School, 1935, has located in Plainview, Minnesota, for the practice of medicine. Mrs. Mahle, who is a graduate of the University of Minnesota Nursing School, is a public health nurse and for the past few years has been actively engaged in nursing in Minneapolis.

* * *

Dr. William L. Wall became resident physician at the Gates Hospital in Anoka, Minnesota, August 7. He is a graduate of the University of Minnesota Medical School and has been in general practice in Osceola, Wisconsin, for a short time. He succeeds Dr. H. J. Aldrich who is now with the Civilian Conservation Corps as camp doctor.

Dr. Floyd M. Burns, graduate of the University of St. Louis and for the past year having served as interne in a hospital in Quincy, Illinois, has arrived home at Milan, Minnesota, where he will join with his father, Dr. M. A. Burns, in the practice of medicine. The elder Dr. Burns has practiced medicine in Milan for the past forty years.

* * *

Dr. John Haskins, formerly located in Northfield, Minnesota, and for the past few years a member of the staff of the New York State Hospital at King's Park, Long Island, has accepted a position as supervisor of Morningside Hospital, the government hospital for Alaskan insane at Portland, Oregon, where he took up his new duties the latter part of July.

* * *

On the evening of August 20, 1936, a group of physicians gave an informal farewell dinner at the Minneapolis Club for Dr. H. A. Reimann, who is leaving the University of Minnesota Medical School to become the Magee Professor of Medicine at the Jefferson Medical College of Philadelphia. Appreciation of the guest of honor and sincere regret at his departure were expressed by those called on by Dr. Moses Barron, master of ceremonies, to "say something."

* * *

The Department of Preventive Medicine and Public Health of the University of Minnesota Medical School will offer graduate work for physicians and engineers contemplating entering the field of Public Health. The School of Public Health Nursing has also made special arrangements to provide special training for nurses who are expected to come to the University from the surrounding states under the provisions of the Social Securities Act. Registration for these courses begins September 24 and lectures will start September 30.

* * *

Dr. William T. Nygren of Braham, Minnesota, has announced that Dr. P. C. Petersen, for the past two years a practicing physician in Ogilvie, Minnesota, will be associated with him in practice and also in work at the Braham Hospital which is operated by Dr. Nygren. Dr. Petersen is a graduate of the University of Nebraska, 1932, and served his internship at Northwestern Hospital, Minneapolis, where he also was house physician the following year. Dr. Nygren is in Chicago this month taking postgraduate work in abdominal surgery at the Cook County Hospital in Chicago.

* * *

As a result doubtless of the recent revelations of the defective plumbing in certain Chicago hotels the Joint Committee on Health Problems in Education of the National Education Association and the American Medical Association passed a resolution at a meeting held in St. Louis, Missouri, February 25, 1936, calling attention of school boards and executives to the advisability of instituting surveys of the plumbing in educational institutions to ascertain whether or not the

danger of back siphonage and consequent pollution of water supply mains may exist. The Committee is giving all possible publicity to the resolution.

* * *

Preliminary announcements have just been made by the Extension Division of the University of Minnesota of two evening medical extension courses of more than ordinary interest—one on "Practical Preventive Medicine" to be conducted by Drs. H. S. Diehl and K. F. Maxcy, in Room 129, Millard Hall; the other on "The Newer Knowledge of Tuberculosis" to be conducted by Dr. J. A. Myers, in the Amphitheater of the University Hospital. Both courses will be held on Thursday evenings for seventeen weeks, the first from 6:20 p. m. to 8 p. m. and the second at 8 p. m. The date of the first meeting is to be announced later. Courses are open to graduate physicians and were planned on the same night for their convenience. Registration should be made through R. R. Price, Director of the Extension Division.

* * *

Sir Henry Wellcome, who was introduced to members of the medical profession attending the Monday evening meeting of the Minnesota State Medical Association last May in Rochester, Minnesota, died on July 25, 1936, at the age of eighty-three in London, following an operation. A founder of the Burroughs Wellcome Company, the Wellcome Historical Medical Museum and the Wellcome Research Institute, Sir Henry Wellcome has left a lasting imprint on the pages of history. Born in 1853 in a log cabin near Almond, Wisconsin, he began his career as a pharmacist in Rochester, Minnesota. After studying pharmacy in Philadelphia his path led to London and eventually he became a leader in his chosen field, both in the United States and in England. His interests extended beyond mere pharmaceutical manufacturing to archeological expeditions in the Upper Nile, sanitation in the Panama Canal zone, the Gorgas Memorial Institute, a Maternity Hospital in Uganda, Chinese medicine and a bacteriological motor field laboratory for use of the British Army in Palestine and Egypt during the World War. Henry Wellcome became a naturalized English citizen during the war and was knighted for his many contributions to science.

* * *

The eighth annual training course for Medical Department Reservists of the Army and Navy will be held at the Mayo Foundation, Rochester, Minnesota, from October 4 to 17, 1936.

This training course was first inaugurated by the Seventh Corps Area at the request of the Mayo Foundation to give training in military medicine to the younger medical men connected with the Foundation. Other reserve officers requested permission to enroll and to take advantage of the opportunity to attend clinical presentations during the morning hours. Such permission was granted and such attendance has become so increasingly popular that it is now necessary to limit the enrollment.

The program will follow the plan of the past years. The morning hours will be devoted entirely to professional work in special clinics and study groups. Officers in attendance may select the course they wish to follow from the wide variety of presentations offered. The afternoons and evenings will be devoted to a medico-military program under the direction of the Surgeon of the Seventh Corps Area (Army) and the Surgeon of the Ninth Naval District (Navy).

This training is on an inactive duty status and is without expense to the Government. Enrollment is open to all Army and Navy reservists of the Medical Departments in good standing. Application should be submitted to the Surgeon of the Seventh Corps Area, Omaha, Nebraska, or the Surgeon, Ninth Naval District, Great Lakes, Illinois. Enrollment is limited to two hundred.

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

Medical Broadcast for September

The Minnesota State Medical Association Morning Health Service

The Minnesota State Medical Association broadcasts weekly at 9:45 o'clock every Tuesday morning over Station WCCO, Minneapolis, and St. Paul (810 kilocycles or 370.2 meters).

Speaker: William A. O'Brien, M.D., Associate Professor of Pathology and Preventive Medicine, Medical School, University of Minnesota.

The program for the month will be as follows:

September 1—Causes of Blindness
September 8—Plantar Warts
September 15—Fear in Childhood
September 22—Gout
September 29—Loss of Teeth

The American Board of Internal Medicine (Inc.)

The American Board of Internal Medicine, incorporated February 28, 1936, completed its organization on June 15, 1936. The officers chosen were Walter L. Bierring, M.D., Des Moines, Chairman; Jonathan C. Meakins, M.D., Montreal, Vice Chairman; and O. H. Perry Pepper, M.D., Philadelphia, Secretary-Treasurer. These officers with the following six members constitute the present membership of the board: David P. Barr, M.D., St. Louis; Reginald Fitz, M.D., Boston; Ernest E. Irons, M.D., Chicago; William S. Middleton, M.D., Madison; John H. Musser, M.D., New Orleans, and G. Gill Richards, M.D., Salt Lake City.

Each applicant for admission to the examination in internal medicine will be required to meet the following standards:

GENERAL QUALIFICATIONS

1. Satisfactory moral and ethical standing in the profession.
2. Membership in the American Medical Association or, by courtesy, membership in such Canadian or other medical societies as are recognized for this purpose by the Council on Medical Education and Hospitals of the American Medical Association. Except as here provided, membership in other societies will not be required.

PROFESSIONAL STANDING

1. Graduation from a medical school of the United States or Canada recognized by the Council on Medical Education and Hospitals of the American Medical Association.
2. Completion of an internship of not less than one year in a hospital approved by the same council.
3. In the case of an applicant whose training has been received outside of the United States and Canada, his credentials must be satisfactory to the Advisory Board for Medical Specialties and the Council on Medical Education and Hospitals of the American Medical Association.

SPECIAL TRAINING

1. Five years must elapse after completion of a year's internship in a hospital approved for interne training before the candidate is eligible for examination.
2. Three years of this period must be devoted to special training in internal medicine. This requirement should include a period of at least several months of graduate work under proper supervision in anatomy, physiology, biochemistry, pathology, bacteriology, or pharmacology, particularly as related to the practice of internal medicine.

   This work may be carried on in any domestic or foreign medical school or laboratory recognized by the Council on Medical Education and Hospitals of the American Medical Association as offering appropriate facilities for this type of postgraduate experience; or it may include a period of at least several months of graduate work under proper supervision in internal medicine or in its restricted and specialized branches in any domestic or foreign hospital, clinic, or dispensary, recognized by the above Council as offering appropriate facilities for this type of postgraduate experience.
3. A period of not less than two years of special practice in the field of internal medicine or in its more restricted and specialized branches.

   The American Board of Internal Medicine does not propose to establish fixed rules for the preliminary training of candidates for certification in this field. Broad general principles for training, however, may be outlined, although such suggestions as are made must, of necessity, be subject to constant changes reflecting the dynamic nature of the specialty.

   A sound knowledge of physiology, biochemistry, pharmacology, anatomy, bacteriology, and pathology, in so far as they apply to disease is regarded as essential for continued progress of the individual who practices internal medicine. The mere factual knowledge of medicine and its basic sciences is not sufficient. The candidate must have had training in their use in furthering his understanding of clinical medicine. This implies practical experience under the guidance of older men who bring to their clinical problems ripe knowledge and critical judgment. Preparation to meet this requirement adequately may be even more difficult to obtain than the so-called scientific training. It may, however, be acquired in the following ways:

   (a) By work in a well-organized hospital outdoor clinic conducted by competent physicians.

   (b) By a prolonged period of resident hospital appointments likewise directed by skilled physicians.

   (c) By a period of training in intimate association with a well-trained and critical physician who has taken the trouble to teach and guide his assistant rather than to require him only to carry out the minor drudgery of a busy practice.
4. The Board does not consider it to the best interests of internal medicine in this country that rigid rules as to where or how the training outlined above is to be obtained. Medical teaching and knowledge are international. The opportunities of all prospective candidates are not the same. Some may have the opportunity of widening their knowledge by a period of study abroad. Others, at the other extreme, may be restricted to a comparatively narrow geographic area and their detailed training must be obtained in short periods scattered over a long time. Although it is laid down that at least five years must elapse between the termination of the first interne year and the time when the candidate is eligible to take the examination, a longer period is advisable. The Board wishes to emphasize that the time and training are but means to the end of acquiring a broadness and depth of knowledge of internal medicine which the candidate must demonstrate to the Board in order to justify it in certifying that he is competent to practice internal medicine as a specialty. The responsibility of acquiring the knowledge as best he may rests with the candidate, while the responsibility of maintaining the standard of knowledge required for certification devolves on the Board.

METHODS OF EXAMINATION

The examination required of candidates for certification as specialists in Internal Medicine will comprise, Part I (written) and Part II (practical or clinical).

PART I The written examination is to be held simultaneously in different sections of the United States and Canada and will include:

(a) Questions in applied physiology, physiological chemistry, pathology, pharmacology, and the cultural aspects of medicine.

(b) Questions in general internal medicine.

The first written examination will be held in December, 1936, and candidates successful in this written test will be eligible for the first practical or clinical examination which will be conducted by members of the Board near the time for the annual session of the American College of Physicians at St. Louis in April, 1937. The second practical examination will be held at Philadelphia near the time of the annual session of the American Medical Association in Atlantic City in June, 1937.

The fee for examination is forty dollars which must accompany the application and an additional fee of ten dollars is required when the certificate is issued.

Application blanks and further information can be obtained by addressing the office of the chairman, Walter L. Bierring, M.D., 406 Sixth Avenue, Des Moines, Iowa, U. S. A.

National Medical Council on Birth Control

Members of the Minnesota State Medical Association will undoubtedly view the recent formation of a National Medical Council on Birth Control as a great advance in the medical progress of birth control. The Council is made up at present of seventy-one physicians from twenty-three states. The function of this Council is "to initiate, encourage and execute appropriate scientific research in the medical aspects of birth control." Although an autonomous body, this Council will control and supervise all medical policies of the American Birth Control League.

It has been felt for some time by many outstanding members of the medical profession and by many prominent lay organizations and individuals that there should be some autonomous medical organization, national in its make-up and commanding entire confidence and authority by virtue of the training, character and reputation of its members, to which medical problems of birth control, from any source, could be referred for study, solution and recommendation for action.

The formation of this Council is another evidence that the medical profession of this country is assuming its accustomed leadership and is planning to meet its obvious responsibility and obligation in this field of public health and preventive medicine as it has always met its responsibilities and obligations in the past.

The executive committee of the Council is headed by Dr. Frederick C. Holden, New York, chairman, and Dr. Eric M. Matsner, New York, executive secretary. Included in the membership of the Council appear the names of Dr. Fred L. Adair, Chicago; Dr. John Erdmann, New York; Dr. J. Shelton Horsley, Richmond; Dr. Floyd E. Keene, Philadelphia; Dr. R. T. La Vake and Dr. J. C. Litzenberg, Minneapolis; Dr. W. A. Pusey, Chicago; Dr. Milton C. Winternitz, New Haven.

INTERNATIONAL MEDICAL ASSEMBLY

Inter-State Post Graduate Medical Association of North America

October 12-16, 1936, Saint Paul, Minnesota

PROGRAM

Pre-Assembly Clinics, October 10

Post-Assembly Clinics, October 17

Saint Paul Hospitals

Monday, October 12

8:00 A. M.

Diagnostic Clinic: "Coronary Thrombosis and Angina Pectoris."

Dr. Fred M. Smith, Professor of Theory and Practice of Medicine, State University of Iowa College of Medicine, Iowa City, Iowa.

Diagnostic Clinic: "Diseases of the Thyroid Gland."

Dr. Robert S. Dinsmore, Cleveland Clinic, Cleveland, Ohio.

Diagnostic Clinic: "Rheumatoid Arthritis."

Dr. Russell L. Haden, Chief of Medical Division, Cleveland Clinic, Cleveland, Ohio.

Diagnostic Clinic: "Trigeminal Neuralgia."

Dr. Francis C. Grant, Assistant Professor of Neurological Surgery, University of Pennsylvania School of Medicine, Philadelphia, Pa.

Diagnostic Clinic: "Pathologic Physiology of the Common Bile Duct and Its Relation to Disease of the Biliary Tract."

Dr. Waltman Walters, Associate Professor of Surgery, University of Minnesota Graduate School of Medicine, Mayo Clinic, Rochester, Minn.

1:00 P. M.

Address: "Obstetric Hemorrhages and Their Treatment."

Dr. Jennings C. Litzenberg, Professor of Obstetrics and Gynecology, University of Minnesota Medical School, Minneapolis, Minn.

Address: "Relation of the Endocrine Glands to Sterility."

Dr. Emil Novak, Associate Professor of Obstetrics, University of Maryland School of Medicine, Baltimore, Md.

Address: "The Radical Cure of Malignant Tumors of the Bladder."

Dr. Hugh H. Young, Professor of Urology, Johns Hopkins University School of Medicine, Baltimore, Md.

Address: "Treatment of Diabetes during Surgical Emergencies."

Dr. Herman O. Mosenthal, Professor of Clinical Medicine, New York Postgraduate Medical School, New York, N. Y.

Address: "Problems in the Diagnosis of Diabetes."

Dr. Robert D. Lawrence, M.A., M.D., F.R.C.P., Physician to Kings College Hospital, Diabetic Department, London, England.

Address: "Neurological Surgery."

Dr. Loyal Davis, Professor of Surgery, Northwestern University School of Medicine, Chicago, Illinois.

7:00 P. M.

Address: "Endocrine Disorders in Childhood."

Dr. Frederick W. Schlutz, Richard T. Crane Professor of Pediatrics, University of Chicago School of Medicine, Chicago, Ill.

Address: "Peritonitis."

Dr. Frederick A. Coller, Professor of Surgery, University of Michigan Medical School, Ann Arbor, Mich.

Address: "Very Recent Advances in Medicine."

Dr. Russell M. Wilder, Professor of Medicine, University of Minnesota Graduate School of Medicine, Mayo Clinic, Rochester, Minn.

Address: "Practical Points in Clinical Surgery."

Dr. W. Wayne Babcock, Professor of Surgery and Clinical Surgery, Temple University School of Medicine, Philadelphia, Pa.

Address: "Intravenous Anesthesia."

Dr. John S. Lundy, Professor of Anesthesia and Surgery, University of Minnesota Graduate School of Medicine, Mayo Clinic, Rochester, Minn.

Tuesday, October 13

8:00 A. M.

Diagnostic Clinic: "Clinical Nutritional Disease (Vitamin B Deficiency)"

Dr. Andrew Almon Fletcher, University of Toronto, Canada.

Diagnostic Clinic: "Diagnosis and Treatment of Brain Tumors."

Dr. Walter E. Dandy, Adjunct Professor of Neurological Surgery, Johns Hopkins University School of Medicine, Baltimore, Md.

Diagnostic Clinic: "The Diagnosis of Bone Lesions."

Dr. Dean D. Lewis, Professor of Surgery, Johns Hopkins University School of Medicine, Baltimore, Md.

Diagnostic Clinic: "Tumors of the Breast."

Dr. John F. Erdmann, Attending Surgeon of the New York Postgraduate Hospital and Medical School, New York, N. Y.

Diagnostic Clinic: "The Psychobiology of the Peptic Ulcer Patient."

Dr. George Draper, Associate Professor of Clinical Medicine, Columbia University College of Physicians and Surgeons, New York, N. Y.

1:00 P. M.

Diagnostic Clinic: "Treatment and Guidance of Patients with Damaged Hearts."
DR. DAVID RIESMAN, Professor of Clinical Medicine and Professor of History of Medicine, University of Pennsylvania School of Medicine, Philadelphia, Pa.; President, Inter-State Post Graduate Medical Association.

Address: "The Treatment of Endocervicitis."
DR. WALTER T. DANNREUTHER, Professor of Clinical Gynecology, New York Postgraduate Medical School, New York, N. Y.

Address: "Diffuse Adenomatosis of the Colon."
DR. FRED W. RANKIN, Lexington, Kentucky.

Address: (Subject to be supplied).
DR. FRANCIS J. CHARTERIS, M.D., Ch.B., Professor of Materia Medica and Therapeutics, St. Andrews University School of Medicine, St. Andrews, Scotland.

Address: "Factors Frequently Overlooked in the Management of the Patient with Heart Disease."
DR. CHARLES A. ELLIOTT, Professor of Medicine, Northwestern University School of Medicine, Chicago, Ill.

Address: "The Diagnosis of Intracranial Complications of Aural and Nasal Sinus Suppuration."
DR. WELLS P. EAGLETON, Oalr., Newark, New Jersey.

Address: "Treatment of Acute and Chronic Mastoiditis."
DR. MATTHEW S. ERSNER, Professor of Otolaryngology, Temple University School of Medicine, Philadelphia, Pa.

7:00 P. M.

Address: "The Consideration and Management of Some of the More Common Congenital Deformities of the Rectum."
DR. VERNON C. DAVID, Clinical Professor of Surgery, Rush Medical College, Chicago, Illinois.

Address: "The Diagnosis and Treatment of Tumors of the Bladder by Means of the Roentgen Rays"
DR. GEORGE E. PFAHLER, Professor of Radiology, University of Pennsylvania Graduate School of Medicine, Philadelphia, Pa.

Address: "The Cerebral Regulation of Autonomic Function."
DR. JOHN F. FULTON, Sterling Professor of Physiology, Yale University School of Medicine, New Haven, Conn.

Address: "Syphilis of the Heart and Blood Vessels."
DR. MAURICE C. PINCOFFS, Professor of Medicine, University of Maryland School of Medicine, Baltimore, Md.

Address: "The Management of Intestinal Obstructions."
DR. OWEN H. WANGENSTEEN, Professor of Surgery, University of Minnesota Medical School, Minneapolis, Minn.

Wednesday, October 14

8:00 A. M.

Diagnostic Clinic: "Paralyses in Children."
DR. BRONSON CROTHERS, Assistant Professor of Pediatrics, Harvard University Medical School, Boston, Mass.

Diagnostic Clinic: "Carcinoma of the Stomach."
DR. DONALD C. BALFOUR, Professor of Surgery, University of Minnesota Graduate School of Medicine, Mayo Clinic, Rochester, Minn.

Diagnostic Clinic: "Economic Advantages of Early Protected Weight-Bearing in Fractures of the Leg, Foot and Ankle."
DR. FRASER B. GURD, McGill University Faculty of Medicine, Montreal, Canada.

Diagnostic Clinic: "Essential Hypertension."
DR. ALFRED W. ADSON, Professor of Neurosurgery, University of Minnesota Graduate School of Medicine, Mayo Clinic, Rochester, Minn.
and
DR. E. V. ALLEN, Assistant Professor of Medicine, University of Minnesota Graduate School of Medicine, Mayo Clinic, Rochester, Minn.

Diagnostic Clinic: "Bodily Type in Relation to Endocrine Function."
DR. CHARLES R. STOCKARD, Professor of Anatomy, Cornell University Medical College, New York, N. Y.

1:00 P. M.

Diagnostic Clinic: "The Nature and Management of Nephritis Edema."
DR. LOUIS H. NEWBURGH, Professor of Clinical Investigation in Internal Medicine, University of Michigan Medical School, Ann Arbor, Mich.

Address: "Circulatory Failure in Acute Infectious Diseases."
DR. WILLIAM R. WILLIAMS, Professor of Clinical Medicine, Cornell University Medical College, New York, N. Y.

Address: "Genesis and Surgical Treatment of Essential Hypertension."
DR. GEORGE CRILE, Cleveland Clinic, Cleveland, Ohio.

Address: "Relation of Diseases of the Sinuses to Organic Disease."
DR. ROBERT F. RIDPATH, Professor of Laryngology and Rhinology, Temple University School of Medicine, Philadelphia, Pa.

Address: "Intrathoracic Goiter."
DR. CHARLES G. HEYD, Professor of Clinical Surgery, New York Postgraduate Medical School, New York, N. Y.

Address: "Non-Surgical Diseases of the Colon."
DR. JOSEPH W. LARIMORE, Associate Professor of Clinical Medicine, Washington University School of Medicine, St. Louis, Mo.

Address: "The Surgical Anatomy of the Anal Canal" (Including Methods of Treatment of Fistula-in-Ano).
MR. C. NAUNTON MORGAN, F.R.C.S., Senior Assistant Surgeon to St. Mark's Hospital for Diseases of the Rectum; Surgeon to the Hospital for Tropical Diseases; Casualty Surgeon to St. Bartholomew's Hospital, London, England.

ASSEMBLY DINNER

7:00 P. M.

Informal

For members of the profession, their ladies and friends.

DR. DAVID RIESMAN, Master of Ceremonies.

Presentation of Token of Appreciation to

DR. CHARLES H. MAYO and DR. WILLIAM J. MAYO, Rochester, Minnesota.

Addresses by eminent members of the profession and other distinguished citizens of the world.

Thursday, October 15

8:00 A. M.

Diagnostic Clinic: "The Relation of the Psychoses to Systemic Diseases."
DR. EARL D. BOND, Professor of Psychiatry, University of Pennsylvania School of Medicine, Philadelphia, Pa.

Diagnostic Clinic: "Indications for Surgery and the Surgical Treatment of Peptic Ulcer."
DR. FRANK H. LAHEY, Director of Surgery in the Lahey Clinic; Surgeon of the New England Baptist Hospital and New England Deaconess Hospital, Boston, Mass.

Diagnostic Clinic: "The Relation of Endocrine Glands to Circulatory Diseases."
DR. LEONARD G. ROWNTREE, Director, Philadelphia Institute for Medical Research, Philadelphia, Pa.

Diagnostic Clinic: "Cryptorchidism."
DR. HUGH CABOT, Professor of Surgery, University of Minnesota Graduate School of Medicine, Rochester, Minn. (Mayo Clinic)

Diagnostic Clinic: "The Relation of Lumbosacral Joint to Low Back Pain."
DR. ALAN DEFOREST SMITH, Clinical Professor of Orthopedic Surgery, Columbia University College of Physicians and Surgeons, New York, N. Y.

1:00 P. M.

Address: "Allergic Diseases."
DR. ROBERT A. COOKE, Assistant Professor of Clinical Medicine, Cornell University Medical College, New York, N. Y.

Address: "Significance of Menorrhagia and Metrorrhagia."
DR. JOHN R. FRASER, Professor of Obstetrics and Gynecology, McGill University Faculty of Medicine, Montreal, Canada.

Address: (Subject to be supplied)
DR. CHARLES H. MAYO, Mayo Clinic, Rochester, Minnesota.

Address: "Applications of Cavity Grafting."
MR. ARCHIBALD H. MCINDOE, M.B., Ch.B. (N.Z.); M.Sc. (Path.); M.S., F.A.C.S.; F.R.C.S. (England), Assistant Plastic Surgeon, Plastic Unit, St. James Hospital, London, England.

Address: "Function and Deformity in Fracture Results."
DR. ELDRIDGE L. ELIASON, Professor of Clinical Surgery, University of Pennsylvania School of Medicine, Philadelphia, Pa.

Address: "The Early Diagnosis of Bronchiogenic Carcinoma."
DR. CHEVALIER JACKSON, Professor of Bronchoscopy and Esophagoscopy, Temple University School of Medicine
and
DR. CHEVALIER L. JACKSON, Professor of Clinical Bronchoscopy and Esophagoscopy, Temple University School of Medicine, Philadelphia, Pa.

Address: "Water Balance in Children."
DR. SAMUEL Z. LEVINE, Acting Professor of Pediatrics, Cornell University Medical College, New York, N. Y.

Address: "The Surgery of Acute and Chronic Compression of the Heart."
DR. CLAUDE S. BECK, Associate Professor of Surgery, Western Reserve University School of Medicine, Cleveland, Ohio.

7:00 P. M.

Address: "Ophthalmic Consultations in a General Hospital."
The Joseph Schneider Foundation Presentation.
DR. LAWRENCE T. POST, Professor of Ophthalmology, Washington University School of Medicine, St. Louis, Mo.

Address: "General Therapeutic Methods for the Protection of Patients in the Extremes of Life."
DR. IRVING S. CUTTER, Dean and Associate Professor of Medicine, Northwestern University Medical School, Chicago, Ill.

Address: "Periodic Health Examination."
DR. REGINALD FITZ, Associate Professor of Medicine, Harvard University Medical School, Boston, Mass.

Address: "The Diagnostic Significance of the Respiratory Rate."
DR. FREDERICK J. KALTEYER, Clinical Professor of Medicine, Jefferson Medical College, Philadelphia, Pa.

Address: "The Sella Turcica."
DR. ERIC OLDBERG, Professor of Neurology and Neurological Surgery, University of Illinois College of Medicine, Chicago, Ill.

Friday, October 16

8:00 A. M.

Diagnostic Clinic: "The Differential Diagnosis of Pain in the Chest."
DR. JOHN A. OILLE, Assistant Professor of Medicine, University of Toronto Faculty of Medicine, Toronto, Canada.

Diagnostic Clinic: "Fracture of the Neck of the Femur: The Problem Fracture."
DR. JOHN J. MOORHEAD, Professor of Clinical Surgery, New York Postgraduate Medical School, New York, N. Y.

Diagnostic Clinic: "Protamine Insulin."
DR. ELLIOTT P. JOSLIN, Clinical Professor of Medicine, Harvard University Medical School, Boston, Mass., and DR. PRISCILLA WHITE, Boston, Mass.

Diagnostic Clinic: "Review of Operative and Nonoperative Treatment of Prostatic Obstruction."
DR. WILLIAM E. LOWER, Cleveland Clinic, Cleveland, Ohio.

Address: "The Differential Diagnosis of Chills and Fever."
DR. JAMES H. MEANS, Jackson Professor of Clinical Medicine, Harvard University Medical School, Boston, Mass.

1:00 P. M.

Address: "Diabetes Insipidus."
DR. ELLIOTT C. CUTLER, Moseley Professor of Surgery, Harvard University Medical School, Boston, Mass.

Address: "Treatment of the Elderly Chronic Cardiac."
DR. CARY EGGLESTON, Assistant Professor of Clinical Medicine, Cornell University Medical College, New York, N. Y.

Address: (Subject to be supplied.)
DR. WILLIAM J. MAYO, Mayo Clinic, Rochester, Minn.

Address: "The Applied Physiology of the Sphincter of Oddi."

Dr. Andrew C. Ivy, Davis Professor of Physiology and Professor of Pharmacology, Northwestern University Medical School, Chicago, Ill.

Address: "The Acute Abdomen."

Dr. Irvin Abell, Clinical Professor of Surgery, University of Louisville School of Medicine, Louisville, Ky.

Address: "The Rôle of the Practitioner and the Specialist in the Management of Urinary Tuberculosis."

Dr. Joseph F. McCarthy, Professor of Clinical Urology, New York Postgraduate Medical School, New York, N. Y.

Graduate Fortnight of the New York Academy of Medicine

Two weeks of afternoon clinics at New York hospitals and evening lectures on trauma, occupational diseases and hazards at the Academy of Medicine headquarters have been arranged for the ninth annual Graduate Fortnight of the New York Academy of Medicine. October 19-31, 1936. Physicians in good standing are invited to register and attend. A charge of $3.00 is made for registration. Further information may be obtained from Dr. Frederick P. Reynolds, the New York Academy of Medicine, 2 East 103rd Street, New York City.

Mayo Foundation Lectures

A special program of lectures and demonstrations in medicine and surgery will be held under the direction of the Mayo Foundation from November 9 to 13, inclusive. Mornings will be devoted to surgical and medical clinics. In the afternoons and evenings symposiums will be conducted on neurology, gynecology, diseases of the ear, nose and throat, laboratory procedures, emergency treatment, pediatrics, and renal diseases. In addition a clinico-pathologic conference will be held. While this program is arranged primarily for the Fellows of the Foundation, visiting physicians are invited to attend.

Mississippi Valley Medical Society

The Mississippi Valley Medical Society, also known as the Tri-State Post Graduate Assembly of Illinois, Missouri and Iowa, will meet at the Hotel Burlington, Burlington, Illinois, September 30, October 1 and 2, 1936. A full three-day program of post graduate instruction will be provided by some forty-seven speakers for the most part from the medical centers of the three states concerned. Subjects with an appeal to the physicians in general practice have been selected. All ethical physicians are invited to register. Dr. H. B. Goodrich, Hannibal, Missouri, is president of the organization and Dr. Harold Swanberg, 211 W. C. U. Building, Quincy, Illinois, is secretary.

BOOK REVIEWS

Books listed here become the property of the Ramsey and Hennepin County Medical libraries when reviewed. Members, however, are urged to write reviews of any or every recent book which may be of interest to physicians.

BOOKS RECEIVED FOR REVIEW

Thirty-Third Annual Report of the Bureau of Science, Philippine Islands. For the year ending December 31, 1934. A. S. Arguelles. 89 pages. Paper binding. Manila, P. I.: Bureau of Printing, 1936.

Microbiology and Pathology for Nurses. Charles F. Carter, B.S., M.D., Director, Carter's Clinical Laboratory, Dallas, Texas, etc. 682 pages. Illus. Price, cloth, $3.00. St. Louis: C. V. Mosby Co., 1936.

An Introduction to Materia Medica and Pharmacology. Hugh Alister McGuigan, Ph.D., M.D., Prof. of Materia Medica, Pharmacology and Therapeutics, Univ. of Illinois College of Med., and Edith P. Brodie, A.B., R.N., Formerly Dir. School of Nursing, Vanderbilt Univ., Nashville, Tenn., etc. 580 pages. Illus. Price, cloth, $2.75. St. Louis: C. V. Mosby Co., 1936.

A Diabetic Manual. For Practitioners and Patients. Edward L. Bortz, A.B., M.D., F.A.C.P., Assoc. Prof. of Medicine, Graduate School of Medicine, University of Pennsylvania, etc. 222 pages. Illus. Flexible binding. Philadelphia: F. A. Davis Co., 1936.

Chemical Procedures for Clinical Laboratories. Marjorie R. Mattice, A.B., Sc.M., Assistant Prof. of Clinical Pathology, N. Y. Post Graduate Medical School of Columbia University, etc. 520 pages. Illus. Price, $6.50, cloth. Philadelphia: Lea & Febiger, 1936.

Arthritis and Rheumatic Disease. Maurice F. Lautman, M.D., Consultant to the U. S. Public Health Service Clinic and Director of Dept. for the Study of Arthritis, Levi Memorial Hospital, Hot Springs, Ark. Foreword by Morris Fishbein. 177 pages. Illus. Price, cloth, $2.00. New York: McGraw-Hill Book

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AMERICAN MEDICAL DIRECTORY. Fourteenth Edition. 2490 pages. Illus. Price $15.00. Chicago: American Medical Association Press, 1936.

Each time a new American Medical Directory appears, which it does every two years, one im impressed with the magnitude of the undertaking. The volume contains not simply information regarding the 183,312 physicians in the United States and its dependencies and Canada, but a wealth of information in addition. The officers, Constitution and By-Laws and medical ethics of the American Medical Association, a brief history of medical schools, hospitals, including those approved by the Council on Medical Education, and Hospitals for interne training and training in the specialties, medical libraries, medical journals, national and interstate societies, members of special societies, medical laws, are some of the inclusions.

It is interesting to note an increase of 109 doctors and seven hospitals in Minnesota, making a total of 3,283 doctors and 219 hospitals in the State.

A new feature in this edition is the indication of certification as a specialist by an approved examining board. A more complete list of specialists will be con-

tained in the next edition as several more of these boards have already been approved by the Council on Medical Education and Hospitals since the directory went to press.

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WILLIAMS OBSTETRICS. A textbook for the use of students and practitioners. Seventh Edition. Henricus J. Stander, M.D., F.A.C.S., Professor of Obstetrics and Gynecology, Cornell University Medical College; Obstetrician and Gynecologist-in-Chief, New York Hospital, and Director of Lying-in Hospital, New York City. 1269 pages. Illus. New York: D. Appleton-Century Co., 1936.

Those physicians who have the habit of examining completely and meticulously the context and bibliography of each new edition of the outstanding textbooks, will be pleased and amply rewarded in studying the new and seventh edition of Williams Obstetrics by Dr. H. J. Stander, Professor of Obstetrics and Gynecology, Cornell University Medical College.

In the main, the structure of the previous editions has not been changed. Some sections have been rewritten and new data added, all in the same succinct, clear and scholarly manner that characterized the writing of Dr. Williams. The new chapters: the sex hormones; amnesia, analgesia and anesthetics in obstetrics; and urinary complication, are excellent. All added illustrations leave nothing to be desired.

The same general spirit of conservatism that pervaded the other editions is present in this edition. A most needed element in our teaching and practice today. One leaves the study of this splendid work with a consciousness that, in addition to its outstanding scientific worth, it is a notable and inspiring example of a solemn, beautiful and reverent tribute to a great master, conceived and performed in a manner that could not be surpassed.

R. T. LaVake, M.D.

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THE PARATHYROIDS IN HEALTH AND DISEASE. David H. Shelling, M.D. 325 pages. Illus. Price $5.00. St. Louis: C. V. Mosby Company, 1935.

The numerous contributions of recent years to the knowledge of parathyroid function has made most timely the appearance of this monograph. The author gives a comprehensive discussion of the present knowledge of the parathyroid glands and the diseases known to be associated with them. The relationship of the parathyroid hormone to the functions of calcium and phosphorus in the body are ably presented and the comprehensive treatment of hyperparathyroidism is outstanding. The final chapter on the use and misuse of parathyroid hormone is especially worth reading, in view of the present tendency to use this substance therapeutically without rational basis.

Joseph F. Borg, M.D.

Treatment of Arthritis by Bee Venom

Attempts have been made repeatedly to place this form of treatment on a scientific foundation. Almost without exception medical reports have been inadequate—inadequate because little attempt at classification of the type of rheumatic diseases treated has been made. Terminology used is most indefinite and indicates lack of familiarity with types of diseases concerned. The terms "rheumatoid heart affections," "endocrine polyarthralgia," "arthritism" and others are used without definition. Beck expressed the opinion that venom therapy has been abandoned because of difficulties in use of live bees. This has been obviated by commercial preparations: Apicosan, immenin, apisin and British bee venom. Beck has attempted to stimulate interest in this method by a review of literature on the subject. He exhibits a lack of critical appraisal of his material, and accepts laymen letters as important evidence. According to Beck, the physiologic effect of bee venom is comparable to histamine, which has been advanced by some for the treatment of rheumatic diseases. These ideas of Beck are not in accord with those accepted by the greater number of writers on the subject. The gross error in Beck's presentation is that he has omitted details of his own experience with treatment. It is stated that patients with "arthritis and rheumatism" possess immunity to bee venom, but in spite of this it has also been repeatedly stated that the results from injection of bee venom in arthritis arise through the production of "a slow, gradual, progressive and comfortable immunization." It is not made clear how one can immunize a person already immune. There are a variety of diseases presumably successfully treated, such as rheumatic fever, endocarditis, Bechterew's spondylitis, myalgia, neuritis, migraine, and others. But, there is no original proof by Beck in support of these statements. Beck's description of the plan of dosage, technic of administration, and reactions are inadequately and unclearly presented. The questioner is referred to Beck's book. Certainly, the place of bee venom therapy in rheumatism is not materially strengthened by this book.—(J. A. M. A., May 2, 1936, p. 1588.)

Digitol-Mulford (Sharp & Dohme, Inc. Reaccepted

Digitol-Mulford (Sharp & Dohme, Inc.) has recently been before the Council on Pharmacy and Chemistry, since the three year acceptance period for inclusion in New and Non-official Remedies has expired. The Council reports that there was published a Notice of Judgment (N. J. 22335) in which it was charged that a shipment of Digitol was found to have almost double the potency represented by the company—"Tincture Digitalis U.S.P. Strength." In view of this, pharmacologic assays were made during the spring of 1935. Specimens of Digitol were purchased from retail drug stores in four widely separated parts of the country and submitted to a well known pharmacologist, who reported that Digitol was found to be neither weaker nor stronger than the U.S.P. tincture. The labels, carton and circulars submitted to the Council were found to be satisfactory. The Council voted that the product be reaccepted for New and Non-official Remedies. (J. A. M. A., August 24, 1935, p. 599.)